THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[REGISTERED AS A NEWSPAPER.]

VOL. XXVIII. No. 693.] LONDON, AUGUST 22, 1876. [28TH YEAR.] Price 6d.

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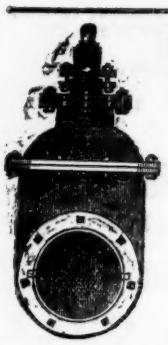
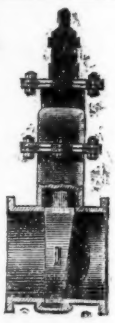


C. & W. WALKERS' DOUBLE-FACED GAS-VALVES.



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The Valve is a rigid wedge of solid cast iron, having two perfectly scraped surfaced facings fitting between the two on the body, which are also surfaced.

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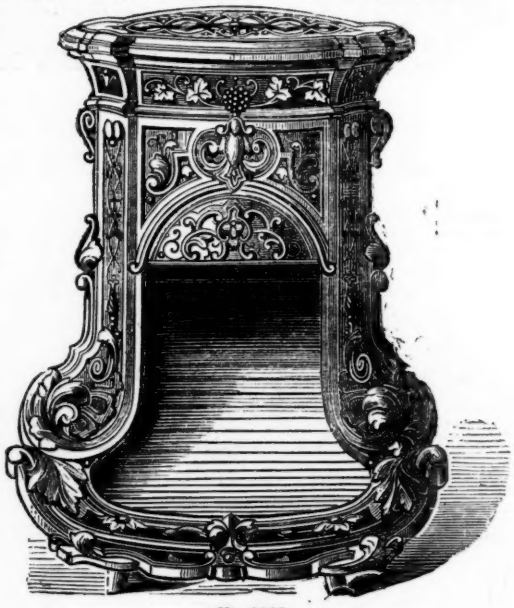

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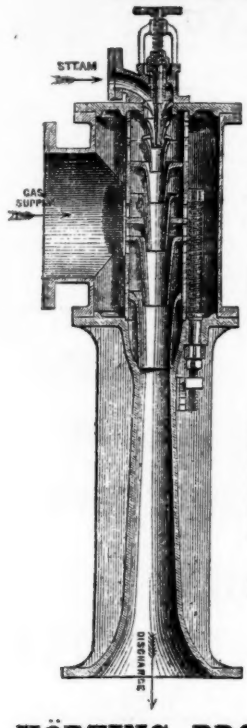

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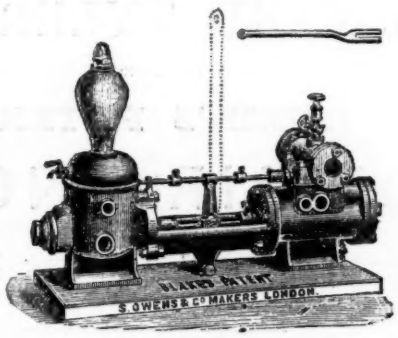

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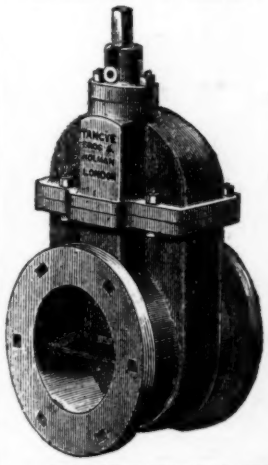

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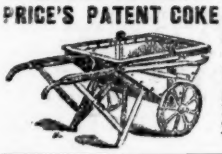

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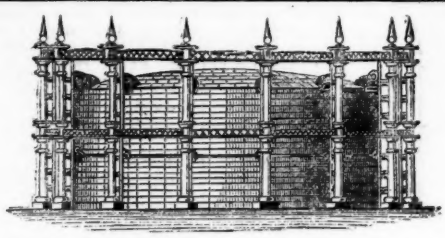
GAS AND WATER FITTINGS;
ALSO,
WROUGHT-IRON TUBES & FITTINGS.
SHORT STREET, LAMBETH, LONDON.

J. BEALE'S PATENT GAS EXHAUSTER.

BEALE'S CONTINUOUSLY ACTING
GAS EXHAUSTERS
ARE NOW MANUFACTURED BY
B. DONKIN & CO.

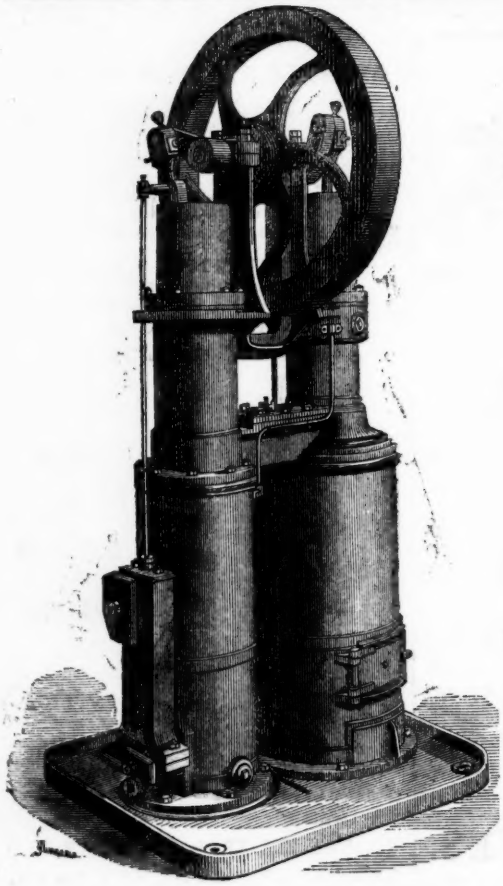
MR. J. BEALE, of East Greenwich, having retired from business, has made an arrangement with B. DONKIN & CO. for the sole manufacture of his Patent Solid-Slide Gas Exhausters.
B. D. & Co. also make Steam-Engines to drive Gas Exhausters direct or otherwise, and Gas-Valves.
Estimates and Prices on application to
B. DONKIN & CO.,
ENGINEERS & IRONFOUNDERS,
55a, BLUE ANCHOR ROAD, BERMONDSEY,
LONDON, S.E.

HOPE IRON WORKS,



STOCKTON ON TEES.

ASHMORE & WHILE,
GAS ENGINEERS & CONTRACTORS,
MANUFACTURERS OF GASHOLDERS,
GAS APPARATUS OF EVERY DESCRIPTION,
Including Improved
Retort-Lids, Boilers, Cast and Wrought Iron Tanks, Iron Roofing, Bridges, Girders,
And GENERAL IRONWORK.
N.B—Estimates for all Gas Plant and Remodelling supplied on application.



THE
SILVER MEDAL
OF THE
ROYAL AGRICULTURAL SOCIETY
WAS AWARDED AT THE
BIRMINGHAM SHOW, 1876,
TO
HAYWARD TYLER & CO.,
FOR THEIR
RIDER'S PATENT
HOT AIR ENGINE
For Pumping and Driving Machinery.

PRICES AND PARTICULARS,
HAYWARD TYLER & CO.,
WHITECROSS STREET, LONDON.

TANGYE BROTHERS AND HOLMAN,

LAURENCE POUNTNEY LANE, LONDON, E.C.,

SOLE MAKERS OF

MORTON'S PATENT SELF-SEALING

RETORT-LIDS,

WITH

HOLMAN'S NEW PATENT

BRACKETED CROSS-BARS,

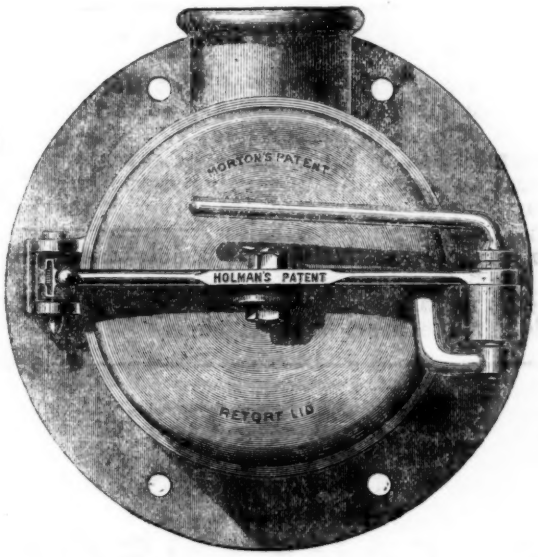
ANTI-FRICTION CATCHES, AND ECCENTRIC FASTENINGS.

NO LUTING.

NO DUPLICATE LIDS REQUIRED.

INSTANTANEOUS SEALING EFFECTED.

VERY DURABLE.



HOLMAN'S NEW SELF-SUSTAINING CROSS-BAR ENSURES FREEDOM OF JOINT, AND MAINTAINS PARALLEL POSITION OF THE LIDS.

By the employment of MORTON'S PATENT SELF-SEALING RETORT-LIDS, with HOLMAN'S PATENT ECCENTRIC FASTENINGS, the old-fashioned, cumbersome, and expensive method of sealing Retorts, by luting the lids with lime and other materials, is entirely dispensed with.

Since their introduction in 1869, these Patent Retort-Lids have been thoroughly tested, over 20,000 being in use at various Gas-Works in London and the Provinces, among which may be mentioned:—

The Gaslight Co., Beckton (where nearly 4000 are in use).
" Gaslight Co., Bow Common.
" Gaslight Co., Silvertown.
" Gaslight Co., Lupus Street.
" London Gaslight Co.
" Independent do.
" Phœnix do.
" South Metropolitan Gaslight Co.
" Commercial do.
" Imperial do.
" West Ham Gas Co.
" Gas-Works, Barnet.

The Gas-Works, Royal Arsenal, [Woolwich.
" do. Lower Sydenham.
" do. Erentford.
" Consumers Gas Co., Woolwich.
" Alliance and Dublin Gas-Works.
" Edinburgh do.
" Manchester Corporation do.
" Salford do. do.
" Rochdale do. do.
" Liverpool Gas-Works.
" Birmingham do.
" Birkenhead do.
" Nottingham do.

The Newcastle-on-Tyne Gas-Works.
" Lurgan do.
" Carmarthen Gas-Works.
" Merthyr Tydfil do.
" Windsor do.
" Leeds do.
" St. Albans do.
" Over Darwen do.
" Rotherham do.
" Aylesbury do.
" Bournemouth do.
" Ystrad do.
" Cardiff do.
" Rochester do.

The Keighley Gas-Works.
" Aberdare do.
" Ballymena do.
" Richmond do.
" Stalybridge do.
" Longton do.
" Exeter do.
" Ross do.
" Falmouth do.
" Barrow-in-Furness do.
" Belfast do.
" Wakefield do.
And other Provincial and Foreign Gas-Works.

IMPORTANT TESTIMONIAL.

The Gaslight and Coke Company (Commonly called the Chartered Gas Company).
Beckton, North Woolwich, July 2, 1874.

MESSRS. TANGYE BROTHERS AND HOLMAN.

Gentlemen,—In answer to your inquiry respecting the Self-Sealing Lids, I beg to say that they continue to work well, and I have every reason to be satisfied with them.

I should be very sorry to return to the old system of Luting, and our stokers here freely acknowledge the benefit to them of the new system.

I am, yours truly,
(Signed) G. C. TREWBY.

London 1851. New York, 1853 Paris, 1855. London, 1862.

Dublin, 1865

The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

LONDON, E.C.

THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS,

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

WILLIAM PARKINSON & CO.,

(SUCCESSORS TO SAMUEL CROSLEY,)

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

MANUFACTURERS OF PATENT

WET & DRY GAS-METERS,

STATION-METERS WITH PLANED JOINTS,

GOVERNORS, PRESSURE REGISTERS, GAUGES,

AND EXPERIMENTAL APPARATUS,

STREET-LAMP METERS,

AND REGULATORS FOR AVERAGE METER INDICATION.

METERS FOR MEASURING WATER.

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, AUGUST 22, 1876.

Circular to Gas Companies.

The report of the Directors of the Chartered Company, which we received at the moment of going to press last week, and published immediately, will, we believe, have been perused with as much satisfaction by the consumers within the vast district of the company, as by the shareholders. To the former, it gives hope of a speedy reduction in the price of gas; to the latter, it gives assurance of full dividends for the past half year, and indirectly conveys more than a hint, that if all continue to go well, larger dividends may be anticipated in a not distant future. A glance over the accounts shows that these hopes and promises are fully justified. When the dividends have been provided for, there will, it seems to us, remain a balance of something like £75,000 to carry forward. Now, a penny per thousand on the gas sold during the past half year would give about £20,000. Thus, it would appear, that a reduction of 3d. per 1000 might be made at once. But the directors are perfectly right in postponing any reduction until future dividends are rendered secure. The report, it is true, speaks of a reduction as "imminent;" but further consideration may possibly convince the directors, that their best policy will be to defer making any alteration of price, until they have a considerable unappropriated balance in hand. Three-and-sixpence will be a very good price to start the sliding scale with, at the beginning of next year. We may remark here, that the public in general are very well satisfied with gas at three-and-ninepence. They would, of course, like it to be cheaper; but the great trading community share in the maxim, "Live and let live." They are quite content that gas companies shall make their legitimate profits, and all the outcry that is made springs from but a few interested agitators.

In this, the first report issued since the great amalgamation was entered into, the directors express their sense of the responsibility which has devolved upon them, in keeping up the gas supply of fully two-thirds of this vast Metropolis. The responsibility is, indeed, great; still, under ordinary circumstances, the manufacture of gas proceeds with the regularity of clockwork. But few emergencies—thank Heaven!—can arise, in the management of a gas undertaking, however large it may be. When compared with one of our leading railways, the responsibility involved in the management of the Chartered Company sinks into insignificance. There are, it is true, some special peculiarities in the management of gas-works; but it is difficult to suppose that fifteen gentlemen, if only of ordinary capacity and experience, would be incompetent to fulfil all obligations. As a fact, however, the directorate of the Chartered Company includes gentlemen possessing the largest knowledge and experience in all departments; and the public and shareholders may rest perfectly satisfied with the assurance that, in this case, their interests are in safe and competent hands.

The directors, in their report, very properly refer to the expenditure they will presently incur, and to the pressing necessity for the raising of further capital. Large extensions of works are absolutely necessary; and by the Act just passed, power is given to purchase about 192 acres of land, which power must be exercised within the next three years. We shall not pretend to estimate the cost of this land and the extensions; but, we may reasonably suppose, it will go far to absorb the greater part of the remaining share and loan capital which the company had power to issue before the passing of the Act of this year. Thus the auction clauses may soon be brought into operation.

The directors seem to think, that the Act of this year is a final settlement of the metropolitan gas question, so far as their company are concerned. A similar opinion was entertained in 1868 and 1869. Then a complete understanding with the local authorities was supposed to have been arrived at, and agitation was believed to be at an end. The coal famine, and the rise in the price of gas, soon dispelled the illusion, and presently, when the sliding scale allows of more than a 10 per cent. dividend, we fully anticipate a revival of discontent.

It is not at all surprising that the large sum now paid by the amalgamated company, in the way of superannuation allowances and annuities, should occupy the serious attention of the directors. According to the accounts before us, this sum exceeds £26,000 a year—a somewhat formidable amount. As a matter of fact, when calculated out, this sum constitutes a very small charge on the consumer. By the opponents of amalgamation, however, these pensions and allowances have always been adduced as arguments against combination. Forgetful that time will efface them, they are always represented as a permanent tax on consumers. It is no wonder, then, that the directors of the amalgamated company are casting about for some means of reducing the expenditure under this head. They propose to commute the pensions at the rates regulating the granting of annuities by the Postmaster-General, and they anticipate much relief from the transaction. They must not, however, expect too much. Some, or many, pensioners may not care to "commute, compound, "and cut," as the Irish clergy put it. They may consider themselves safe with their pensions, but would not know what to do with the commutation money. The design of the directors is, however, laudable, and we hope it will be successful. As the money must come out of revenue, we presume it is intended to devote the large unappropriated balance we have already mentioned to the purpose. If so, it may, perhaps, defer for a time a reduction of price to the extent we have supposed. We wait for explanations, which will probably be offered by the Governor at the coming meeting. We also wish for a clearer statement of the views of the directors as to the formation of a domestic-fund, to ensure the fidelity of the officers of the company. The present system of private guarantee may be uncertain, but it involves no charge on the company. If an officer prove dishonest, and the sureties fail, of course a loss results; but that would only indicate a want of caution on the part of those who accepted the surety. The disappearance of the "Defalcation "Account" suggests that the directors are anxious to insure themselves against another Higgs. We can tell them how they may do so most effectually, and that is by attending to their business. They have no right to trust to private guarantees or "domestic-funds." They have simply to keep up that continuous audit which the safety of their affairs demands, and no officer or servant can go far wrong.

METROPOLIS GAS COMPANIES, 1875.

REVENUE ACCOUNT, *compared with that of* 1874, *showing the Increase or Decrease in each Item.*

	Chartered.		Commercial.		Imperial.		Independent.		London.		Phœnix.		Ratcliff.		South Metropolitan.		Surrey Consumers.	
	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.
	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£
Total gas-rental	..	194801	..	1259	..	133911	5206	..	..	3791	..	4864	24	..	10275	..	2420	..
Common gas	..	70795	..	1415	..	111722	5233	..	..	2639	..	5089	..	2	9849	..	1666	..
Cannel gas	..	107894	..	..	..	..	..	..	..	1370	..	..	..	..	..	..	..	..
Public lights, including lighting and contracts	..	16112	156	..	..	22189	..	27	218	..	225	..	26	..	426	..	754	..
Meter-rents	279	..	..	..	1065	..	48	..	82	..	180	..	42	..	..	..	..	10
Old materials	..	2668	..	47	399	..	..	175	..	574	..	74	16	..	..	586	146	..
Products	11553	..	5643	..	26430	..	4383	..	..	394	2819	..	1209	..	5424	..	1767	..
Miscellaneous	..	211	..	150	..	149	..	19	259	..	..	311	64	..	26	..	..	23
Total income from all sources	..	185849	4187	..	..	106166	9443	..	..	4418	..	2250	1355	..	15139	..	4300	..
Total expenditure on revenue account	..	93839	..	3045	..	100157	..	9261	..	13570	..	21947	..	2488	8459	..	..	445
Gross profit	..	86960	7232	..	..	6009	18704	..	9152	..	19697	..	3843	..	11680	..	4745	..
Capital and borrowed money	199998	..	..	..	..	125477	1500	..	13872	..	3000	..	..	..	45249	..	..	..
Gross profit per cent. on capital	..	2·56	1·61	..	..	0·50	7·30	..	0·91	..	1 83	..	3·33	..	1·95	..	1·64	..
Gross profit per cent. on gas-rental	..	2·01	4·58	..	5·28	..	18·43	..	4·53	..	7·96	..	10·41	..	7·30	..	4·65	..

METROPOLIS GAS COMPANIES, 1875.

EXPENDITURE, *compared with that of* 1874, *showing the Increase or Decrease in each Item.*

	Chartered.		Commercial.		Imperial.		Independent.		London.		Phœnix.		Ratcliff.		South Metropolitan.		Surrey Consumers.	
	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.
	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£
Coals, including carriage and dues	..	98394	..	22718	..	104833	..	13659	..	32820	..	22703	..	5716	..	8614	..	8842
Purifying materials	1244	..	92	..	1575	..	510	..	392	..	679	..	22	..	1464	..	111	..
Supervision, labour, &c.	..	1139	1450	..	..	1157	1328	..	..	448	2133	..	270	..	..	742	376	..
Repair and maintenance of premises, tools, &c	..	14265	5420	..	5532	..	2033	..	18328	..	..	3815	398	..	8805	..	799	..
Rent, rates, and taxes	..	5222	..	164	..	1511	..	246	54	..	..	999	..	84	..	107	..	142
Salaries	163	..	..	4	..	370	155	..	282	..	..	231	129	..	35	..	99	..
Collectors commission	..	948	..	34	248	..	125	..	176	..	365	..	..	2	164	..	16	..
Stationery, printing, and general charges	841	..	53	..	..	75	206	..	..	2049	1897	..	29	..	82	..	95	..
Directors	..	..	..	..	..	..	..	..	..	..	500	..	13	..	10	..	250	..
Auditors	..	250	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
Distribution and repair of mains and services, &c.	9554	..	4386	..	..	2094	222	..	3727	..	299	..	1837	..	1072	..	978	..
Restoring and replacing meters	3776	..	..	83	919	..	96	..	..	149	293	..	167	..	476	..	564	..
Law and parliamentary charges	5591	..	8553	..	..	19	297	..	960	..	1022	..	461	..	397	..	253	..
Bad debts and extraordinary expenses	160	..	4	..	1628	..	..	328	..	1723	..	1387	..	12	426	..	4998	..

DETAILS OF INCOME, FOR THE YEAR 1875.

Name of Company.	Total Gas-Rental.	Common Gas.	Price per 1000 Cubic Feet.	Cannel Gas, at 3s. 9d. to 5s. 0d. per 1000 Cubic Feet.	Public Lights, including Lighting and Contracts.	Meter-Rents.	Old Materials.	Products.	Miscellaneous.
	£ s. d.	£ s. d.	s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Chartered	896,705 5 7	726,517 17 10	3 9	112,534 4 0	57,653 3 9	10,939 0 0	3657 9 8	244,804 17 4	4,458 15 10
Commercial	164,146 15 5	148,043 17 9	3 9	..	16,102 17 8	..	335 2 6	49,356 0 3	11 17 6
Imperial	719,851 9 7	647,561 12 5	3 9	..	72,289 17 2	17,779 11 6	2050 15 6	210,995 17 2	1,624 12 2
Independent	96,514 14 6	90,256 6 6	3 6	..	6,258 8 0	2,731 10 2	135 9 3	38,478 6 2	262 15 10
London	227,202 4 3	192,380 4 4	3/9 to 4/6	12,616 15 8	22,205 4 8	3,923 12 0	508 11 8	64,188 0 9	2,949 13 6
Phœnix	265,806 1 9	240,423 18 3	3/9 to 4/2	..	25,382 3 6	5,325 19 4	861 17 8	68,271 8 8	2,448 10 0
Ratcliff	36,870 2 8	33,050 5 5	3 9	..	3,819 17 3	327 18 6	73 12 3	13,354 8 5	367 6 2
South Metropolitan	125,715 12 1	111,833 8 5	3 0	..	13,882 3 8	..	221 5 10	52,991 13 9	325 8 6
Surrey Consumers	86,450 13 11	72,265 6 5	4/2 & 4/6	..	14,185 7 6	2,083 11 0	301 0 0	24,590 12 10	651 0 0
Total	2,619,262 19 9	2,262,332 17 4	..	125,150 19 3	231,779 3 2	43,111 2 6	8145 4 4	767,031 5 4	13,099 19 6

ABSTRACT OF DETAILS OF INCOME AND EXPENDITURE, SHOWING THE PROFIT REALIZED.

Total Income from all Sources.	Total Expenditure on Revenue Account.	Gross Profit.	Capital and Borrowed Money.	Gross Profit per Cent. on the Capital and Borrowed Money.	Gross Profit per Cent. on Gas-Rental.
£ s. d.	£ s. d.	£ s. d.	£ s. d.		
1,160,565 8 5	861,431 4 3	299,134 4 2	4,163,498 0 0	7·18	33·36
213,849 15 8	171,092 0 7	42,757 15 1	450,000 0 0	9·50	26·05
952,302 5 11	677,900 5 5	274,402 0 6	3,352,182 10 0	8·19	38·12
138,122 15 11	103,270 10 4	34,852 5 7	255,000 0 0	13·67	36·11
293,772 2 2	219,882 19 0	78,889 3 2	889,244 12 6	8·87	34·72
342,713 17 5	240,983 4 4	101,730 13 1	1,060,000 0 0	9·59	38·27
50,993 8 0	34,775 1 5	16,218 6 7	115,670 0 0	14·02	43·99
179,254 0 2	139,269 7 3	39,984 12 11	430,000 0 0	9·30	31·81
114,076 17 9	84,034 11 6	30,042 6 3	289,995 0 0	10·36	34·75
3,450,650 11 5	2,532,639 4 1	918,011 7 4	11,005,590 2 6	8·34	35·95
				Mean.	

DETAILS OF EXPENDITURE ON REVENUE ACCOUNT, FOR THE YEAR 1875.

Name of Company.	Coals, including Carriage and Dues.	Purifying Materials, including Labour.	Supervision and Labour in Manufacture.	Ordinary Repair and Maintenance of Premises, Tools, and other Implements.	Rents, Rates, and Taxes.	Salaries, Management.	Collectors Commission.	Stationery, Printing, and General Charges.	Directors.	Auditors.	Expense of Distribution & Ordinary Repairs of Mains and Services, Lighting & Repairing Lamps.	Restoring and Replacing Meters.	Law and Parliamentary Charges.	Bad Debts and Extraordinary Expenses.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Chartered	509,366 13 7	19,410 8 1	82,405 17 3	77,651 13 1	23,220 19 2	4,893 7 2	12,152 14 1	5,671 3 10	5,000 0 0	300 0 0	63,053 10 5	28,071 10 0	10,697 0 0	19,536 7 7
Commercial	90,276 19 4	2,127 12 7	19,292 7 7	24,929 11 7	3,619 13 10	1,519 15 0	1,619 6 0	1,738 11 4	1,500 0 0	150 0 0	12,321 10 7	1,681 4 5	8,946 17 10	1,368 10 6
Imperial	410,274 3 1	23,874 15 7	66,936 19 0	73,104 15 11	17,385 12 4	6,815 17 0	10,887 19 7	5,584 18 1	4,000 0 0	210 0 0	35,329 5 7	13,162 8 11	3,831 0 1	6,502 10 3
Independent	63,038 9 2	1,270 2 10	12,566 13 3	10,557 9 2	2,276 2 1	1,084 17 0	1,762 10 10	961 8 3	1,700 0 0	100 0 0	5,677 3 6	1,387 17 7	297 1 4	590 15 4
London	106,025 7 4	3,441 19 8	22,510 14 7	38,525 18 11	8,337 5 2	2,148 10 10	3,285 17 6	1,628 18 7	1,800 0 0	150 0 0	13,019 10 3	2,989 15 2	1,205 7 1	14,813 13 11*
Phœnix	140,739 6 7	3,316 6 5	22,682 13 3	29,571 6 0	8,428 11 2	2,327 14 10	4,198 17 0	2,443 9 3	2,500 0 0	100 0 0	15,386 18 4	4,152 14 0	1,554 11 5	3,080 16 1
Ratcliff	17,335 18 11	569 7 9	4,726 7 5	3,013 5 2	1,234 8 6	907 17 6	367 7 0	311 9 10	813 0 0	31 10 0	4,214 7 4	448 2 1	461 6 8	340 13 3
South Metropolitan	77,398 5 10	3,580 13 2	17,874 4 1	14,541 19 3	4,360 13 3	1,435 0 0	1,934 16 8	1,334 18 4	1,200 0 0	100 0 0	11,428 3 0	2,156 5 5	436 18 1	1,487 10 2
Surrey Consumers	40,953 5 5	796 0 1	9,181 7 4	11,669 15 4	2,744 3 10	1,098 16 0	953 0 0	871 1 4	1,750 0 0	84 0 0	6,692 8 3	1,080 5 3	291 2 10	5,869 5 10
Total	1,455,408 9 3	58,387 6 2	258,177 3 9	283,505 14 5	71,607 9 4	22,231 15 4	37,162 8 8	20,545 18 10	20,263 0 0	1,225 10 0	167,622 17 3	55,130 2 10	27,721 5 4	53,590 2 11

* This item includes the sum of £12,092 11s. 5d. paid to the Chartered Company for cannel gas supplied in bulk.

TABLE *showing the Income, Expenditure, Profit, and Capital of the Metropolis Gas Companies per Ton of Coal carbonized in* 1875.

Name of Company.	INCOME. Total Gas-Rental.	Meter-Rents.	Old Materials.	Products.	Miscellaneous	Total Income from all Sources.	EXPENDITURE. Coals, including Carriage and Dues.	Purifying Materials.	Supervision and Labour in the Manufacture of Gas.	Ord. Repair & maintenance of Premises, Tools, & other Implements.	Rents, Rates, and Taxes.	Salaries, Management.	Collectors Commission.	Stationery, Printing, and Gen. Charges.	Directors.	Auditors.	Expense of Distribution & Ordinary Repairs of Mains and Services, Lighting & Repairing Lamps.	Restoring and Replacing Meters.	Law and Parliamentary Charges.	Bad Debts, and Extraordinary Expenses.	Total Expenditure on Revenue Account.	PROFIT. Gross Profit per Ton of Coal carbonized.	CAPITAL. Capital and Borrowed Money per Ton of Coal carbonized.
	s. d.	d.	d.	s. d.	d.	s. d.	s. d.	d.	s. d.	s. d.	s. d.	d.	d.	d.	d.	d.	s. d.	d.	d.	s. d.	s. d.	£ s. d.	£ s. d.
Chartered	36 7·71	5·36	1·79	10 0·04	2·19	47 5·09	20 9·77	9·52	3 4·41	3 2·08	0 11·39	2·39	5·96	2·78	2·45	0·15	2 6·92	13·76	5·25	0 9·58	35 2·41	12 2·68	8 10 1·61
Commercial	33 9·53	..	0·83	10 1·93	0·03	44 0·32	18 7·04	5·26	3 11·66	5 1·59	0 8·94	3·75	4·00	4·30	3·70	0·37	2 6·44	4·15	22·10	0 3·38	35 2·68	8 9·64	4 12 7·73
Imperial	32 9·47	9·72	1·12	9 7·33	0·89	43 4·53	18 8·26	13·05	3 0·59	3 3·96	0 9·50	3·73	5·95	3·05	2·18	0·12	1 7·31	7·20	2·09	0 3·55	30 10·54	12 5·99	7 12 8·32
Independent	30 10·68	10·49	0·52	12 3·78	1·01	44 2·48	20 2·11	4·88	4 0·27	3 4·55	0 8·74	4·17	6·77	3·69	6·53	0·38	1 9·80	5·33	1·14	0 2·27	32 0·63	11 1·85	4 1 7·37
London	39 3·63	8·14	1·06	11 1·24	6·12	51 8·19	18 4·09	7·14	3 10·73	6 7·97	1 5·31	4·46	6·82	3·38	3·74	0·31	2 3·02	6·21	2·50	2 6·75	38 0·43	13 7·76	7 13 9·90
Phœnix	36 7·35	8·80	1·42	9 4·84	4·05	47 2·46	19 4·63	5·48	3 1·49	4 0·88	1 1·93	3·85	6·94	4·04	4·13	0·17	2 2·26	6·86	2·57	0 5·09	33 2·32	14 0·14	7 6 0·07
Ratcliff	34 6·21	3·68	0·83	12 6·03	4·13	47 8·88	16 2·76	6·39	4 5·10	2 9·85	1 1·87	10·20	4·13	3·50	9·13	0·36	3 11·35	5·03	5·18	0 3·83	32 6·68	15 2·20	5 8 3·48
South Metropolitan	27 9·95	..	0·59	11 8·77	0·86	39 8·17	17 1·60	9·51	3 11·48	3 2·63	0 11·58	3·81	5·14	3·55	3·19	0·26	2 6·36	5·73	1·16	0 3·95	30 9·95	8 10·22	4 15 2·24
Surrey Consumers	39 0·09	11·28	1·63	11 1·15	3·52	51 5·67	18 5·74	4·31	4 1·71	5 3·19	1 2·86	5·95	5·16	4·72	9·47	0·45	3 0·24	5·85	1·58	2 7·78	37 11·01	13 6·66	6 10 10·19
Mean per Ton	34 9·69	6·87	1·30	10 2·32	2·09	45 10·27	19 4·09	9·31	3 5·17	3 9·21	0 11·42	3·55	5·93	3·28	3·23	0·20	2 2·73	8·79	4·42	0 8·55	33 7·88	12 2·39	7 6 3·04

We publish to-day our abstract of the accounts of the Metropolitan Gas Companies for 1875. There is no special feature to be pointed out in the accounts; but if any reader should be struck by the large decrease in the revenue of the Chartered Company, as compared with the previous year, we must ask him to bear in mind that, in 1874, the company charged 5s., and last year only 3s. 9d. per 1000 feet. The comparative statement of expenditure shows, of course, a large decrease in the cost of coal. Last year, in fact, the gas industry returned almost to its normal condition. The accounts of the current year will show a still further reduction in the item mentioned, and if a continuation of present prices could be calculated upon, the prospects of the companies would be brilliant. As it is, they are by no means bad, and yet are capable of being made better. When we have next to go through these accounts, the Ratcliff, the Imperial, and Independent Companies will have disappeared, and thus a further simplification will have been effected. Possibly, too, other combinations will have been entered into, and the number of companies still more reduced. We shall miss the opportunity of the "competi-" tion of comparison," which the late Mr. Newton so ardently desired to be retained; but, after all, there are very few items that can fairly be made the subject of comparison, and we regard it as a pity that invidious distinctions should be drawn. We commend the accounts to the careful consideration of our readers, and leave them to draw their own conclusions.

From the subjoined table, which we have always given in the "Circular," it will be seen how even the practical workings of the several companies are, from a manufacturing point of view:—

Table of the Residuals and Gas made per Ton of Coals Carbonized by the Metropolis Gas Companies in the Year 1875.

Name of Company.	Coke per Ton of Coals, in Bushels.	Breeze per Ton of Coals, in Bushels.	Tar per Ton of Coals, in Gallons.	Ammoniacal Liquor per Ton of Coals, in Gallons.	Gas Made. Feet per Ton
CHARTERED. . . .	32·81	2·65	10·76	28·22	10,334
COMMERCIAL . . .	33·33	3·78	9·49	18·91	10,026
IMPERIAL	33·83	4·69	8·77	20·68	9,502
INDEPENDENT . . .	33·00	1·96	9·61	13·08	9,332
LONDON	35·11	4·36	9·97	22·89	9,682
PHŒNIX.	36·00	2·80	9·38	26·42	9,886
RATCLIFF	35·66	2·55	9·50	28·58	9,758
SOUTH METROPOLITAN	35·92	2·22	9·01	21·71	9,806
SURREY CONSUMERS .	32·77	2·01	9·82	15·15	10,200
Mean per Ton . .	33·85	3·39	9·77	23·44	9,892

The report of Mr. M'Quie, the accountant appointed by the Recorder of Liverpool to investigate the accounts of the United Gas Company, will be found in another place. The auditor, we may say, without meaning any offence, has done his best to make out a case against the company, and, to our minds, he has signally failed. He has hit upon a few small blots; but they are only such, we venture to think, as may be found in the books of every statutory gas company in the kingdom. All have, at one time or other, found some perplexity in apportioning certain items of expenditure between revenue and capital accounts. Sometimes the difficulty has been boldly solved, but we need not stop to give illustrations.

In the case of the Liverpool Company, there has been no attempt at concealment, and, managed as the undertaking is, by some of the ablest men in the gas world, we cannot but suppose that, when the inquiry is opened before the Recorder, a perfect justification for the allocation of the sums in dispute will be offered. We will, however, assume for the moment that the conclusions of the auditor are correct, and that, during the past twenty years, the sum of £114,000 has been paid out of income, but which was wholly, or in part, chargeable to capital account. Supposing the whole could properly have been charged to capital, it results, as we have argued on previous occasions, that the consumers have been saved the payment of ten per cent. on this additional capital. As a fact, the appropriation of income in this way goes directly to the reduction of the price of gas. The addition of £114,000 to capital would involve the payment, by the consumers, of a large sum for dividends, which they are saved by the appropriation of income in the way alleged.

Waiting some explanations, which will presently be made, we shall not comment on the paragraph in the report dealing with the meter account. We pass to the reserve-fund, in their dealings with which, we have not the smallest doubt that the directors were perfectly justified. On every account, it was to the interest of the shareholders that this fund should not be drawn upon more than was absolutely necessary. That it has fallen to its present small dimensions, is a great misfortune for the shareholders, and one that might easily have been avoided. From what has gone before, it will be seen that the company might have increased their capital, and kept up their reserve. Perhaps, however, as the matter is still *sub judice*, we had better not discuss this question further. There is, meanwhile, one point raised by Mr. M'Quie, which does not appear, to us, to admit of a doubt, but which is really of very great importance. A company, having original capital, entitled to ten per cent., go to Parliament and obtain power to raise additional capital at seven per cent. Is this additional, to be regarded as preference, capital? We believe not. The seven per cent., we consider, is liable to all the accidents attending the ten per cent. capital, and any loss will fall equally on both. Similarly, the reserve-fund will be applicable to make up any deficiency in the dividend on either. As to the amount the reserve-fund may reach, that must always be settled by the wording of each special Act, but there can be no doubt on the matter, when the general Acts are incorporated.

There is only one other subject to which we need refer, and that is the deposit account. We have more than once mentioned this as large, if not excessive, and have remarked that the sum deposited—£35,000—is a fair working capital for the company, and, so far, is an advantage to the general consumer, though not exclusively to the individuals who contribute the money. Mr. M'Quie sees this clearly, and in substance reproduces our argument. At the same time, he suggests that a minimum rate of interest should be paid, and so far we agree with him. We regard the rate fixed by the Gas-Works Clauses Amendment Act, 1870—viz., five per cent.—as excessive. The rate paid by the Post-Office Savings Bank would, we think, be ample, and we would recommend the Liverpool Company in future to pay interest to that amount—$2\frac{1}{2}$ per cent. After the inquiry, which will take place at the September sessions, we shall have again to refer to this matter. We leave it to-day, with a strong expression that the gas company have nothing to fear from the investigation which will ensue.

The local authorities of Poole, Winchester, and Deal may, perhaps, consult with advantage a paragraph we publish to-day, relative to the lighting of Harrogate with petroleum lamps. It will be seen that, after a year's trial, the local authority of the place mentioned are only too happy to patch up their differences with the gas company, and resume public lighting with gas. We refrain from more particular comments on the facts of the case, since we could not give a full explanation without the introduction of names, which might involve us in dispute. So far as Harrogate, at all events, is concerned, the extravagance and inconvenience of petroleum for public lights have been clearly demonstrated.

A TREATISE ON THE SCIENCE AND PRACTICE OF THE MANUFACTURE AND DISTRIBUTION OF COAL GAS.

CV.

QUANTITATIVE ANALYSES OF GAS.

BUNSEN AND ROSCOE'S METHOD (*continued*).

Having described, in the previous chapter, the apparatus required for the analysis of coal gas, by the method of Messrs. Bunsen and Roscoe, it now remains to show the actual application of the process, and the mode of calculating the results. The first proceeding which is necessary is to introduce a quantity of the gas to be examined into an absorption-tube, and to accurately determine its volume. For this purpose the tube is carefully filled with mercury, which is best accomplished by means of a long funnel of small diameter, similar to that represented at fig. 1. Care must be taken to displace all air-bubbles which may happen to adhere to the sides of the tube, which may be effected by giving the tube one or two sharp taps after filling. The absorption-tube having been thus filled, the orifice is closed by the thumb, and the tube placed in the mercurial trough, and adjusted in a perfectly vertical position, for which purpose a plumb-line is provided (shown in the sketch of apparatus already given); the whole must now be left for about one hour, in order that the temperature of the gas may become the same as that of the operating room. At the expiration of the time named, the exact volume of the gas may be ascertained by the cathetometer, without approaching the apparatus close enough to cause any elevation of temperature. At this point of the description, a short digression will be necessary, in order to explain the method of taking what is termed "a reading." The telescope, or cathetometer, is placed at a distance of from 2 to 6 feet from the absorption-tube, and as nearly as possible on a level with the surface of the mercury, the height of which it is wished to observe. Across the field of vision are stretched two cross-wires, and when an observation is being made, the telescope is moved to such a position that the level of the mercury is seen at the point of intersection of the cross-wires, and the reading is then taken. Every reading which is made involves four observations—viz., temperature in degrees, Fahrenheit or Centigrade, pressure as indicated by the barometer in inches or millimetres, level of the mercury in trough and height of mercury in absorption-tube. The absorption tubes and endiometers are graduated in equal divisions from above to below, and the graduations are usually, for the sake of convenience in reading, either in divisions of inches or in millimetres. As it is impossible to obtain tubes of equal internal diameter throughout, each tube before use has to be calibrated, the value of its divisions throughout being ascertained by introducing

FIG. 1.

measured portions of mercury. The results are placed in a table side by side with the divisions, so that the volume corresponding to any reading can be seen at a moment's glance. It is necessary to take the level of the mercury in the trough as well as in the absorption-tube at each observation, for the reason that the actual volume of the gas is regulated by the two elements of the atmospheric pressure as indicated by the barometer, and the height of mercury in the tube above the level of that in the trough. The true pressure on the volume of gas is ascertained by deducting the height of mercury in the absorption-tube from that of the barometer, also making allowance for the tension of aqueous vapour in the event of the gas not being in a dry condition. It is almost superfluous to remark that all observations are corrected to a standard temperature and pressure before being finally recorded. Referring again to the gas which had been introduced into the absorption-tube, after a sufficient time for the proper equalization of temperature, the mercury levels are carefully taken, together with the readings of the barometer and thermometer, and the results noted. The following is then the mode of calculation adopted in order to obtain the true volume of the gas at 60° Fahr. and 30 inches barometer, presuming the gas to be saturated with aqueous vapour. Let the corrected volume be represented by V^1, m, the error of the meniscus* and B, the height of the barometer, while B^1 is the height of the mercury column in the absorption tube, B^2 the tension of the aqueous vapour,† and t^0 the correction for temperature, then

$$V^1 = \frac{(v + m)\ (B - B^1 - B^2) + 0{\cdot}0583}{(30 + {\cdot}002083t^0)}$$

An example taken from Bunsen's "Gasometry," in which the French measures there used have been calculated to English inches, and the temperature altered from Centigrade to Fahrenheit, will, perhaps, better explain the mode of calculation.

Gas Saturated with Moisture.

	Inches.
Observation at the lower level of mercury	22·278
Observation at the upper level in absorption-tube .	12·492
Height of column B^1 to be subtracted from height of barometer . . . . . (b^1)	9·787
The division 12·492 corresponds to a volume in the table of capacity of . . . . . (v)	11·523
Correction for the meniscus . . . . . (m)	0·0015
Temperature of the air	68·0
Height of the barometer . . . . . (b)	29·407
Tension of aqueous vapour for 68° Fahr. . . . . (b^2)	0·6929

Then V^1, the corrected volume, is obtained thus:—

$$V^1 = \frac{(11{\cdot}523 + 0015)\ (29{\cdot}47 - 9{\cdot}787 - 0{\cdot}6929) + 0583}{30{\cdot}07498} =$$

$$= \frac{218{\cdot}1823}{30{\cdot}07498} = 7{\cdot}254 \text{ inches.}$$

This example will show the method of correction to be adopted in order to obtain the true volume of gas at the standard temperature and pressure (60° Fahr. and 30" B.), including likewise the correction for the tension of aqueous vapour. In the event of the gas being *dry*, the same mode of calculation is adopted, with the exception that the aqueous vapour correction (b^2 in the calculation) is omitted.

As will have been seen, the calculation is somewhat simplified by operating on a dry gas; and for this reason it is best, where possible, to dry the volume of gas under experiment by means of a ball of fused calcium chloride prior to testing. In cases where it is necessary to operate on *moist* gas, care should be taken that the gas is thoroughly saturated with aqueous vapour, which may be assured by introducing a drop of water into the absorption-tube prior to the commencement of an experiment.

It will now be assumed that the volume of gas dried (preferably) by a ball of fused phosphoric acid has been accurately determined. There is then present for analysis a mixture of hydrogen, marsh gas, or light carburetted hydrogen, olefiant gas, and its homologues, carbonic acid, sulphuretted hydrogen, and nitrogen. From this mixture sulphuretted hydrogen may be removed by the introduction of a ball of manganese dioxide, saturated with syrupy phosphoric acid. The ball must be introduced with the precautions which have been already mentioned, and while the absorption is going on, the tube containing the gas is best left in the position represented in the diagram, fig. 2. The absorption being complete, the tube is restored to its vertical position, and after sufficient time has been allowed for the proper equalization of temperature, readings may be made in the same way as before, the results noted and necessary corrections made. Carbonic acid may next be removed by means of a ball of fused caustic potash, which, previous to being used, must be moistened with water until sufficiently soft to be readily marked by the nail. After the absorption is complete, readings are taken and the results noted as before. Carbonic oxide may then be eliminated by the introduction of a ball of *papier maché*, imbued with a strong and acid solution of cupreous chloride. After the absorption is complete, the hydrochloric acid vapour which has been liberated must be removed by a caustic potash ball before a final reading is made, and the result recorded. Olefiant gas and its homologues are next removed by introducing into the gas a coke ball, soaked in fuming sulphuric acid, the acid fumes being subsequently removed by a potash ball. Finally, there remains in the absorption-tube a mixture of hydrogen, light carburetted hydrogen, and nitrogen, and as neither of these gases can be estimated by the use of absorptive reagents, the analysis has to be completed by explosion in the eudiometer, and subsequent calculation of the results.

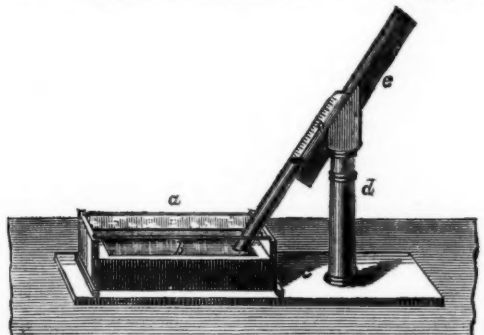


FIG. 2.

* This is a correction of volume which has to be made in consequence of the concave surface assumed by the surface of the mercury in the absorption-tube.

† This correction is obtained by reference to tables which have been calculated for the purpose.

(*To be continued.*)

Correspondence.

PRICE OF GAS IN DUMFRIES.

SIR,—In reference to the statement in the JOURNAL OF GAS LIGHTING of the 8th inst., upon the reduction in the price of gas in Dumfries of only 2d. per 1000 feet, making it 5s. 10d., I wish to inform you that, for the last three years, the price of gas in Dumfries has been 4s. 6d., 5s., and 6s. per 1000, according to the amount of consumption; consequently, the lowest price now charged is 4s. 4d. per 1000 feet of 25-candle gas.

Dumfries, Aug. 16, 1876. A. MALAM.

FRANKLIN'S PATENT GAS-REGULATOR.

SIR,—While thoroughly appreciating the exceeding ingenuity and usefulness of the station governor of Mr. Peebles, of Edinburgh, so excellently described in your report of the meeting of the North British Association of Gas Managers, may I be permitted to point out that the idea of sealing the valve in a separate vessel of mercury or water cannot be claimed as a novelty, it having formed one of the chief features of the regulator, known as "Franklin's Patent," introduced some years ago?

177, *Stanhope Street, N.W., Aug.* 16, 1876. A. H. HEWARD.

Parliamentary Intelligence.

HOUSE OF LORDS.

TUESDAY, AUG. 15.

The Pollution of Rivers and the Llandudno Improvement Bills received the Royal Assent.

HOUSE OF COMMONS.

MONDAY, AUG. 14.

The Lords amendments to the Pollution of Rivers Bill were agreed to.

METROPOLITAN VESTRY CONTRACTS.

Mr. BECKETT DENISON gave notice that, next session, he would move for a select committee to inquire into the system of metropolitan vestry contracts, in so far as they affect the paving, lighting, cleansing, and watering of the streets of the Metropolis, and the removal of refuse from dwellings.

HOUSE OF COMMONS COMMITTEE.

THURSDAY, MAY 4.

(*Before Colonel* LOYD LINDSAY, *Chairman; Mr.* PORTMAN, *Mr.* BENETT STANFORD, *and Mr.* S. MOORE.)

NEWCASTLE AND GATESHEAD WATER BILL.

Sir E. BECKETT, Q.C., Mr. LITTLER, Q.C., and Mr. PEMBROKE STEPHENS, appeared for the promoters; Mr. POPE, Q.C., Mr. PEMBER, and Mr. SHIRESS WILL for Mr. *Riddell*, of Felton, the only remaining petitioner against the bill.

Sir E. BECKETT, in opening the case for the promoters, said the object of the bill was to make extensions of works to meet the growing requirements of the district in which the company were situated. The company were originally the Whittle Dene Water Company, which, in 1845, began to supply water from Whittle Dene, about 12 miles from Newcastle. In 1853 they made additional reservoirs, and obtained powers to extend their limits, and in 1864 it became again necessary to extend their limits, and take in the Swinburne and Hallington district, and they proposed a larger scheme which was not carried, being opposed by the same gentleman who opposed now; but in 1863 the capital was increased still further, and the limits of the company defined. Again, in 1866, more works and more capital were authorized. In 1870 the same thing occurred, and there was then added powers to sell to Shields; and now again a time had come when the company found it necessary to confine the supply of water from the Tyne to manufacturing purposes, which would take 3 million gallons per day, whilst the quantity required for domestic purposes would be about 6 million gallons. In 1874, in common with those of many others, the reservoirs of the company were nearly empty, and the supply, instead of being constant, was reduced to a few hours per day, whilst in the higher parts of the town the supply lasted for a very short time indeed. That state of things went on for seven months, more or less; and during that time, if they had not possessed power to take water from the Tyne, which, whatever might be its quality, was better than none, a very serious state of things would have existed. That, he thought, would show the absolute necessity there was for getting a new supply of water. To do that they proposed to avail themselves of the district already given to them, which he thought everybody would think better than if they went into new districts, and scattered their works about the country and interfered with watersheds which may be considered as belonging to other persons. In the present case it was a remarkable fact that they had no facilities for millowners. They proposed to make their reservoir at Swinburne and West Hallington, and to enlarge their reservoir at Whittle Dene. The opposition to this plan was from Mr. Riddell, of Felton, who was also owner of Swinburne Lake, and had to a certain extent limited them in 1854, when he suggested that they should

get their water nearer to Newcastle, whereas now he preferred they should go further away. Amongst other of the objections was one relating to taking the water from the Dry Burn, but the company were quite willing to agree to send down the stream an amount of water calculated upon the amount which they settled to send down another stream some few years ago. The water they now sought to get was the best water in the district, and he believed Mr. Hawkshaw considered that, instead of saving the expense of the works by the alternative proposal of Mr. Riddell, the cost would be very much increased. This, however, was not the case of a company earning enormous dividends, as the average for the last seven years had been only a little over 5 per cent.; and now they had in these extended works no motive of increased profits, believing, however, that they would be able to meet the wants of the neighbourhood, and keep up a moderate dividend.

Lieut.-Colonel *Potter*, ex-Mayor of Newcastle, and a director of the Water Company, examined by Mr. LITTLER, said that the population of Newcastle and Gateshead was increasing at the rate of 2000 per annum. There was no source of water supply in the towns except through the company. In 1874, he was Mayor of Newcastle, and at that time, owing to the great drought, there was great difficulty in obtaining a supply of water, especially in the higher parts of the town; and in his own neighbourhood for a long time they could not obtain water from the company's services on Sundays. They were then obliged to pump from the Tyne to the works, to which the consumers objected. By the present bill, it was proposed to take the water from the Tyne for the supply of factories. Were another drought to take place, they would be obliged again to depend altogether upon the Tyne for their entire supply. They had taken the best engineering advice possible as to obtaining means for extending their supply, and the present scheme was the result of the advice.

Cross-examined by Mr. POPE: Witness said he was not aware whether the nature of the scheme had been explained to Mr. Riddell when the plans were deposited. He did not think the scheme would hurt the estates of Mr. Riddell.

Mr. POPE: You are aware that Mr. Riddell is willing to let you have a good supply of water, provided you do no injury to the estate?

Witness: I cannot say that we understood that, because we could not ascertain exactly what Mr. Riddell's objection was.

Mr. POPE: If you can get the water without hurting Mr. Riddell's estate, or going against his wishes, would you rather have it that way?

Witness: Yes; very much rather.

Mr. *D. D. Main*, secretary and general manager of the company, said that the consumption of water in Newcastle and Gateshead was 9 million gallons per day —3 million being required for trade, and 6 million for domestic purposes. The consumption was increasing at the rate of 200,000 gallons per day per annum. They proposed to filter all their domestic supply, which he considered would be best derived from the Swinburne district. The increase in the demand for manufacturing purposes was 300,000 gallons per head per annum. The average number of gallons per head of the population was 25 gallons per head. In further examination, witness expressed his opinion that the present scheme was the best that could be devised in the interests of the company, the consumers, and the owners of land which it would be necessary to deal with in the construction of their works.

Mr. *Johnston*, architect and surveyor, of Newcastle, gave evidence as to the great increase of houses, and consequent increased demand for water. As the town spread itself out, the water company had greatly to extend their operations. Great dissatisfaction existed amongst the population of Newcastle and Gateshead in consequence of the frequent defective supply.

Mr. *C. S. Bell*, land agent, York, said he was well acquainted with the locality of Swinburne, and knew where Mr. Riddell's land was. The land on one side of the burn belonged to the Duke of Northumberland, that on the other to Mr. Riddell. The duke was not opposing the bill. He and his father had had to do with water questions in Northumberland ever since the company were formed in 1845. In his opinion there was no injury likely to be done in the present case that would not fairly be covered by compensation, and he could see nothing in the opposition now offered which should be sufficient to stop the bill altogether. He was examined at considerable length by Mr. Stephens, and stated circumstances where it might be proper to compensate Mr. Riddell. He did not think it likely that the works would do any serious injury to the mansion at Swinburne.

Mr. *William Bell*, one of the agents of the Duke of Northumberland, and a farmer of between 2000 and 3000 acres of land, said he had examined the land proposed to be dealt with, and considered it of very moderate class. He did not consider Mr. Riddell's land at Upper Swinburne could be made to suffer much from want of shelter.

Mr. *T. Gow*, land agent and surveyor, gave similar evidence.

FRIDAY, MAY 5.

Mr. *Joseph Cowen*, M.P. for Newcastle, deposed to the local requirements in respect of water. He stated that a good deal of public interest had been displayed in the matter in consequence of the previous failures in the water supply, and he believed it was a very general opinion that there should be no further delay in providing for a sufficient supply. The matter was pressing both on Newcastle and Gateshead, and he was of opinion that the scheme proposed would meet public requirements.

In cross-examination by Mr. PEMBER, witness said he was not connected with the projection of the scheme, though he was acquainted with the history of the water supply of the two towns, and, to some extent, with that of the present scheme, to which, he believed, Mr. Riddell had a general objection. So far as his opinion went, he considered it of much greater importance to get a proper supply of water for the town than to study the interests of individuals.

In re-examination, witness said he considered it would be most calamitous for the two towns and the district, if such a supply as they seemed likely to obtain by the company's bill was not obtained, and great injury might accrue if the bill did not pass.

Mr. *Michael Dodson*, inspector of the water-works at Hallington, said he knew the site of the proposed new reservoirs. He considered it very necessary that there should be increased facilities for the storeage of water, and he believed that the projected reservoirs were well adapted for the purpose of keeping a proper supply of water for all times of the year. If one of these reservoirs were struck out, then the object of securing a full supply would not be answered. They would not then be able to get a thorough supply of the best water, and the advantages of the scheme would be very seriously impaired.

Cross-examined: He said he was not the author of the scheme, it was the work of the engineers.

In re-examination, he said the engineers consulted him, and he gave them all the information that his experience and knowledge of the district enabled him to give, and stated as well as he could what quantity and quality of water they were likely to obtain.

Mr. *G. H. Hill*, C.E., said he had had considerable experience in water engineering works for many years. The plan of the works now before the committee was drawn up by him, after due investigation into the circumstances, and after consultation with his partner, Mr. Bateman. In 1862 his partner, Mr. Bateman, made a report upon the subject of the water supply of the district, the population at the time being 155,000, and the consumption 4,700,000 gallons a day, which was equal to about 31 gallons per head; 24 of these being for domestic purposes, and the remainder for trade. The works were equal to 4 million gallons per day, and besides that they had pumping-works. At that time, the reservoir was projected at Hallington, and had since been constructed. They had also put up filtering-works, and done all they could to increase the supply, but they were still, from time to time, obliged to take water from the river Tyne, though considerable objection had been made to their doing so. He believed the corporation had power to restrain them from using water from the Tyne. In 1873 the consumption had risen to 8½ millions of gallons, being at the rate of about 34 gallons per head—25 of which were for domestic purposes, and the remainder for trade purposes. Then came the drought in 1874, which raised in a pressing way the question of an increased supply of water by means of enlarging the works of the company. The present consumption was 9 million gallons—6 millions for domestic and 3 millions for trade purposes. He was consulted as to the best means of meeting the case, and the result was the bill now before the committee. The bill proposed to use the Tyne water alone for the purposes of the trade of the district, and he believed that, by those interested in the matter, that was considered a satisfactory arrangement. At present the accommodation for storing the water was totally inadequate. The works now proposed were a natural extension of those already in existence, and he was of opinion that they would be sufficient to meet the requirements of the district, at the rate it was now advancing, for the next 20 years.

In answer to a MEMBER of the COMMITTEE, witness said it was proposed that the trade supply of water should be entirely from the Tyne, unless they had an overflow from other sources, which might now and then occur in wet weather. At present the Tyne water, filtered and mixed with other water, was being used for drinking purposes.

In reply to Mr. STEPHENS, witness said he considered the water derived from gravitation and that obtained by pumping should be kept separate. The estimated cost of the scheme was £211,690. There was nothing to lead to the belief that the reservoirs would be in any way dangerous. The site had not been selected with a view of injuring Mr. Riddell at all. He did not see any likelihood of the Swinburne being used for manufacturing purposes.

Mr. *C. F. Hamond*, M.P. for Newcastle, said he was a member of the corporation of the borough, and was aware that the state of the water supply had created great interest and anxiety. A full, which meant a better, supply of water than they had at present was absolutely necessary for the health of the inhabitants of the town, and he was of opinion that the scheme now proposed was one calculated to do what they wanted in respect to the water supply. For many years there had been a pressing want of increased facilities for storing water, and he believed that the accommodation the bill proposed to give in that respect was very greatly required. If the storeage power was curtailed, the value of the scheme would be very much lessened. An increased supply was highly necessary, and unless they had such adequate storeage accommodation as it was now sought to provide, much less security than was desirable would exist with reference to the future supply, when the population had increased and the industry of the district became extended. If the bill should be thrown out, he was very much afraid that in any dry seasons which might occur the mortality in the district would be very great. The bill had the cordial support of the Newcastle Corporation, and he believed that in that respect what applied to Newcastle applied to Gateshead also.

Cross-examined: He had not had anything to do in connexion with the promotion of the scheme, and was not aware of any opposition to it until a day or two ago. The population to be supplied in Newcastle and Gateshead was 170,000 or 180,000, but the outlying districts would bring it up to about 200,000. The Company's Act provided for a supply at the rate of 24 gallons per head per day, which should be ample, but sometimes they did not get more than 4 gallons. He knew of no town so badly provided with water as Newcastle. He was not aware that the present supply amounted to 27 gallons per day for each person, and he objected altogether to the statement. When he made the objection he referred to Newcastle alone, and not to the district generally.

Mr. PEMBER: If the bill passes, the company would be able to supply 13,500,000 gallons per day, which would give 56 gallons per head.

Witness: So much the better. Hitherto one great deficit in the action of the company had been that the supply of the future had not been sufficiently looked to.

In re-examination, witness said he was not connected with the water company. He did not consider any less comprehensive scheme than the present would be sufficient for the purpose of meeting the requirements of the inhabitants of Newcastle and Gateshead. The Corporation of Newcastle had pressed the matter on the attention of the company, and would be satisfied with nothing less than what was now offered.

Mr. *Grey*, agent to the Northumberland estates of the Lords of the Admiralty, was examined in favour of the scheme. He did not think any injury could accrue to Mr. Riddell's property.

Sir *John Hawkshaw*, C.E., said he had examined the plan, and was satisfied that the estimates were sufficient, and that the adoption of the scheme would be beneficial to the public, and do Mr. Riddell no harm. He believed Mr. Hill's scheme the best that could be devised for the supply of the district.

Mr. *J. F. Tone*, C.E., having been examined in support of the scheme, the case for the promoters was closed.

Witnesses for the petitioner were then called.

Mr. *Sample*, land agent, said he had viewed the sites of the proposed reservoirs. He considered the position of two of the sites interfered very much with Little Swinburne farm—they cut it in half. The land which was to be taken for the reservoirs was almost the only shelter there was upon the farm. The existence of the reservoirs so near at hand would make the farmhouse objectionable as a residence. The large body of water was likely to injure health.

Mr. *Dods* (Anick Grange) was examined on the same side.

MONDAY, MAY 8.

Mr. *Richard Gibson*, solicitor, of Hexham, said he was receiver and manager of Mr. Riddell's estate, and acted in like manner in regard to several other estates in Northumberland. He knew the situation of the proposed works. No communication took place between him and the promoters with regard to the scheme until after the notices were published. He considered that, in the bill, no provision had been made to secure compensation to Mr. Riddell, and he was the more surprised at that, inasmuch as he called twice upon the solicitors for the promoters, and failed to see them. He left his card, but no notice was taken of it, and no notice was taken of their objection to the bill until they came to London to oppose it. The property proposed to be dealt with by the company had been for a long period in the possession of the Riddell family. Mr. Riddell did not desire a large money compensation, and would much rather that the works were not placed on his property at all. The injury done by the proposed works to Little Swinburne Farm was incalculable. If the works were constructed in the way proposed, the farm of Little Swinburne would be left without any shelter: and upon this point he challenged the opinion of any land agent present. Mr. Riddell owned about 7000 acres in that part of Northumberland, and Little Swinburne was about the centre. Two of the reservoirs were also in the centre. They would, he considered, be very prejudicial to Mr. Riddell's property, though he was of opinion that the adoption of the plan suggested by Mr. Riddell, though it would not be altogether free from injury to the property, would be the least prejudicial that could be devised. As a matter of fact, they did not want the works at all; but of the two evils they preferred to choose the less. They had no wish to deprive Newcastle of water, but they wished the company to give in to the alternative scheme proposed by Mr. Riddell. The property had been a long time in the Riddell family. Mr. Riddell's object was not to get a large money compensation, but

to protect his property, and have as little injury done to it as possible. At present Swinburne was let to Mr. Langton. Before these proceedings were commenced, Mr. Riddell had determined to reside at Swinburne Castle, and had given notice to Mr. Langton; but subsequently, at his own request, the notice to Mr. Langton was extended to this month twelve months. When he first knew Swinburne Castle, Mr. Riddell's father and mother lived there. With regard to the question of shelter, he had to say that no artificial shelter could compensate for that of which the Little Swinburne Farm would be deprived by the proposed works. They had now some good grazing ground; but if the works proposed were carried out it would be worthless. At present, no matter which way the wind blew, there was shelter for the cattle; but if the proposed works were executed, the stock would be driven away from the close supervision of the farmer and his assistants, whereas the stock was at present under their observation. If the reservoir were constructed as Mr. Liddell wished, he would not mind much; but at the same time he would rather the works were not constructed there at all. Nevertheless, he did not wish to see Newcastle and Gateshead deprived of water. Mr. Riddell's property could not be benefited in any way by the construction of the proposed works; but rather than there should be a deprivation of water, he was willing that a reservoir, such as he now suggested, should be constructed. As might be expected by sportsmen, Mr. Riddell wished to keep the centre of his estate quiet. There were excellent coverts for foxes on the estate, perhaps the best in the county, and there was excellent coursing ground in the valley. The fox-hunting was largely indulged in by gentlemen of Newcastle.

Cross-examined: He did not think that the damage done to the estate could be met by any money compensation. Mr. Riddell's first object was to preserve his estate intact. He could not say that the damage likely to be caused by the proposed bill was such as to cause Mr. Riddell to sell his estate. The value of the land was £800 a year for 1200 acres at Little Swinburne, and the castle and the shooting was let for £400 a year. It was not a fact that the site of one reservoir was so damp that the cattle could not graze upon it. He did not know that the promoters were willing to give Mr. Riddell the right to fish and shoot over the reservoirs. If they agreed to that, of course one of the matters in question would be removed. He was very glad to hear of such a proposition. He certainly thought the promoters should have communicated with Mr. Riddell before they deposited the bill, especially as they knew Mr. Riddell had a great objection to the scheme.

Mr. *J. Fenwick*, local land agent for Mr. Riddell, also gave evidence in favour of the petitioner's case. Mr. Riddell's scheme would not secure him against injury, but it was the better one. The farm-house at Little Swinburne would suffer from the reservoirs. He believed Mr. Riddell's scheme would meet the requirements of the company.

Mr. *Cail*, C.E., formerly Mayor of Newcastle, and largely connected with engineering works, said he had inspected the district, and was of opinion that Mr. Riddell's scheme was the better one of the two—better than that of the company. He believed it would yield more storeage room than was afforded by all the reservoirs—1, 2, and 3 put together. The works proposed by the company would be very dangerous and expensive; whilst Mr. Riddell's scheme could be carried out at little cost and quickly, which was what the two Tyneside towns required. If found necessary, that portion of the land which was considered peaty could be cut off from the proposed reservoir.

Cross-examined by Mr. LITTLER: He had taken a very great interest in the water supply of Newcastle, and had taken part in discussions on the subject. He had advocated a supply from Ulleswater, where he thought they would get the best water obtainable. He had no desire to throw any impediment in the way of the company, and it was only last year that he inspected the ground they proposed to take. It was then that he came to the conclusion that the proposed works would be dangerous. He preferred the scheme by which the corporation were to take the supply into their own hands to the scheme of the company. He did not think it desirable to depend upon the ordinary sources of the company for the water supply of Newcastle.

Mr. *Bewicke* was also examined in favour of the petitioner's case.

TUESDAY, MAY 9.

Mr. POPE said that, as the result of concessions made by Mr. Riddell, they must consider the matter as arranged; and probably when he told them what was done they would think it desirable to adjourn the matter, in order that they might have time to prepare a new clause in accordance with the arrangement. On the part of Mr. Riddell, they had, after careful consideration, and, taking into consideration the evident feeling of Sir John Hawkshaw, determined to be content with the abandonment of reservoir No. 3. He should, therefore, allow the company to take their bill to construct reservoirs No. 1, and the smaller reservoir, No. 2. Mr. Riddell, although he was actuated by a strong regard for his own property, had no desire to put any obstacle in the way of the people of Newcastle and Gateshead getting a good supply of water. He, therefore, suggested that they should adjourn the bill, when he thought they would have the clauses amended in accordance with the wishes both of Mr. Riddell and the public.

The suggestion was agreed to, and the consideration of the bill deferred. At a subsequent period the clauses were brought up and agreed to, and the bill was ordered to be reported.

HUNTINGDON AND GODMANCHESTER GAS COMPANY.—The annual meeting was held on the 2nd. inst.—Mr. A. Ashton in the chair. The directors report stated that the business of the company had not fallen off. The reduction of 5d. per 1000 feet in the price of gas from Sept. 1 last had, of course, diminished the company's receipts. The directors, finding that the fitting business had ceased to be remunerative, had discontinued it. The balance-sheet showed a sum of £891 5s. 10d. available for dividend, and the directors recommended that a dividend of 8 per cent. be declared, free of income-tax, and that the difference between £891 5s. 10d., shown by the balance-sheet, and £960—the amount necessary to pay 8 per cent.—be taken from the present reserve. The report was adopted, and the retiring directors re-elected, the Earl of Sandwich being appointed chairman of the board.

WAKEFIELD WATER-WORKS COMPANY.—On Friday, the 18th inst., the twenty-ninth and last ordinary half-yearly meeting of shareholders was held. Mr. W. Statter, the chairman of the directors, presided. The report of the directors was as follows:—"In presenting the balance-sheet and report for the half year ending June 30, 1876, your directors recommend the payment of the usual dividend of 9 per cent. per annum upon the old capital, and the guaranteed dividend of 5 per cent. per annum upon the £10 shares. This will require £100 1s. 11d. to be taken from the reserve-fund. A further reduction of £261 15s. has to be made to cover leakages to this time. The reserve-fund, therefore, stands at £1341 0s. 5d. Your directors have pleasure in reporting that the company's bill of this session has passed both Houses of Parliament. Messrs. William Stewart and Francis Cardwell retire by rotation as directors, and are recommended for re-election. Mr. John Hesling retires by rotation as auditor, and is also recommended for re-election." The report was adopted, the retiring directors and auditor were re-appointed, and the meeting closed with a vote of thanks to the chairman for his services since 1853, and to the other directors. The company's works have been sold to the corporation, and, until the purchase-money is paid, the works will be under the management of the present directors, and the shareholders will receive interest instead of dividend.

Miscellaneous News.

METROPOLIS GAS SUPPLY.

Dr. Whitmore's report on the illuminating power, pressure, and quality of the coal gas consumed in the parish of Marylebone, and supplied by The Gaslight and Coke Company, during the month of July, 1876:—

	Illuminating Power in Sperm Candles.			Mean Pressure in Tenths of an Inch.		Mean Quanty. of Sulphur in 100 Cu. Ft.	Mean Quanty. of Ammon. in 100 Cu. Ft.	Sulphuretted Hydrogen.
	*Mean of 24 Obser.	High-est.	Low-est.	High-est.	Low-est.	Grains.	Grains.	
Gas supplied from the Fulham works . .	16·43	16·91	15·44	23·77	8·53	19·63	0·73	No trace
Gas supplied from the Beckton and Bow works	16·52	16·84	16·21	27·60	14·08	10·60	04·6	No trace
Cannel gas supplied from the Pimlico works	20·59	21·14	20·24	17·60	11·35	10·13	0·53	No trace

Mean of daily readings of barometer . . . 29·90
" " " thermometer . . . 70·50

* Each observation consists of ten readings of the photometer, at intervals of one minute.

During the month the mean illuminating power of the gas supplied to the parish by The Gaslight and Coke Company, from their Fulham works, was equal to the light of about 16½ sperm candles; it ranged between 15·44 and 16·91 candles; once only was it under the standard. The mean amount of sulphur found in 100 cubic feet of this gas was 19·63 grains, and of ammonia three-fourths of a grain. The gas supplied from the Beckton and Bow works gave a mean light equal to 16½ candles; it ranged between 16·21 and 16·84 candles. The mean quantity of sulphur found was 10·60 grains, and of ammonia less than half a grain. The cannel gas supplied from the Pimlico works gave a mean light equal to 20½ candles; it ranged between 20·24 and 21·14 candles; twice it exceeded 21 candles. The mean amount of sulphur found in this gas was 10·13 grains, and of ammonia a little over half a grain. The pressure of all the three gases was satisfactory, and on no occasion was sulphuretted hydrogen detected by the ordinary tests.

Dr. Whitmore, in his annual report for 1875, on the gas supply of Marylebone, says: "The mean illuminating power of gas supplied by the Imperial Company, when consumed at the rate of 5 feet per hour through a 24-hole standard Argand burner, was, taking the entire year, equal in intensity to the light given by 16½ sperm candles of six to the pound—it ranged between 15·58 and 17·19 candles. The highest illuminating power observed on any single testing during the year was in the month of July, when it reached 18 candles, the lowest in January, when it was 15 candles. The months in which the mean illuminating power was highest were January, February, June, and July, those in which it was lowest were March, October, and November. The legal standard illuminating power of this gas was 14 candles, showing an excess of two candles and upwards during the year. The mean quantity of sulphur found in 100 cubic feet of this gas during the year was 21·27 grains; in the first eight months of the year it often reached 25 and 27 grains, afterwards it fell to an average of about 16 grains. The mean quantity of ammonia found was 0·72 of a grain; in no single month did it amount to one grain; this impurity may now be said to have been practically got rid of. The mean illuminating power of the common gas supplied by the Chartered Company was equal in intensity throughout the year to the light from 16 sperm candles; it ranged between 15·38 and 16·91 candles; the highest illuminating power of this gas on any single testing occurred in June, when it reached to 17·31 candles; the lowest occurred in April, when it was only 14·64 candles. The standard illuminating power of this gas, as fixed by Act of Parliament, is 16 candles. The mean amount of sulphur found throughout the year was 14·14 grains; in the month of December it was as much as 18 grains, in September it was only 10 grains. I have before stated that the comparatively small amount of sulphur compounds found in this gas is owing to lime being used in its purification; this, however, cannot be used if the gas-works are surrounded by a numerous population, because of the highly offensive character of the residual products. The mean intensity of light given during the year by the cannel gas was equal to nearly 21 sperm candles; it ranged between 19·59 and 22·06 candles; the highest illuminating power observed on any single testing occurred in February, when it reached 23 candles; the lowest in October, when it was 19·21 candles. The mean quantity of sulphur found in this gas during the year amounted to 19·41 grains, which varied considerably in different months. The pressure of all the gases was satisfactory, and was throughout the whole year characterized by great uniformity. On no occasion throughout the entire year was sulphuretted hydrogen detected in either of the gases by the ordinary tests. The arrangements made by the vestry with The Gaslight and Coke Company—which is now the only company that supplies the parish with gas, owing to the Imperial Company having recently become amalgamated with it—for reducing the number of lighting hours in the public lamps will effect a saving of about £900 per annum, and I may congratulate the board that this has been done without the adoption of what is called the 'Average Meter System.' The vestries of St. Pancras and Paddington having introduced this system into their respective parishes, at a considerable cost to the ratepayers, are naturally loth to admit that it has failed altogether in realizing the objects they contemplated, for it is only necessary to refer to their own published reports to prove that every shilling they have saved in the cost of gas to their street lamps is caused by a reduction in the number of lighting hours, and in the rate of consumption per hour."

METROPOLIS WATER SUPPLY.

Major Bolton reports that the water in the river Thames at Hampton, Molesey, and Sunbury (where the intakes of the West Middlesex, Grand Junction, Southwark and Vauxhall, Lambeth, Chelsea, and East London Companies are situated), was slightly stained during the whole of the month of July. The highest flood state of the river was 3 inches above the (6 feet) summer level, and the lowest was 2 inches below summer level. The highest temperature of the water taken at Seething Wells was 73°, and the lowest 66°, while the highest temperature of the air at the same place was 91°, and the lowest 62°. The condition of the water in the river was good on 23, and indifferent on eight days. These observations were made daily at 9 a.m. The rainfall for the month was 0·49 inches.

Dr. Whitmore, in his annual report for 1875 on the water supply of Marylebone, says: "The water supplied to the parish during the past year by the West Middlesex and Grand Junction Water Companies has been generally of excellent quality; that of the former company has been uniformly bright, clear, and colourless, perfectly free from taste or smell, and on no occasion when subjected to microscopical examination, found to contain any living or dead organisms. I may here repeat what I have before stated, that the characteristic purity of

this water is due to the very ample provision made by the company for its efficient filtration and storeage—so ample indeed that in times even of the heaviest storms and floods it has been perfectly free from turbidity. The water of the latter company has greatly improved during the year, and this is due to an increase in the area of their subsiding reservoirs and filtering-beds; with but few exceptions this water has also been bright, clear, and colourless."

Dr. Whitmore's report on the composition of Thames companies and other waters supplied to Marylebone during July, 1876:—

	Total Solid Matter in degrees or grains per Imperial gallon.		* Loss by incineration of Solid Matter in previous column.		Hardness before boiling, in degrees.	Hardness after boiling 15 minutes, in degrees.
	July, 1875.	July, 1876.	July, 1875.	July, 1876.		
Distilled Water . . .	0°	0°	0°	0°	0°	0°
West Middlesex . . .	21·52	18·32	1·08	0·72	12·8	2·7
Grand Junction . . .	22·64	18·72	1·20	0·80	13·0	2·9

* The loss by incineration represents the amount of organic and other volatile matters contained in the Imperial gallon (70,000 grains) of water.

	Chlorine, in Grains, per Gallon.	Parts per Million. Free Ammonia.	Albuminoid Ammonia.
West Middlesex	1·62	0·00	0·07
Grand Junction	1·10	0·00	0·08

The water of both companies, as seen through a glass tube, 2 feet in length, was clear, bright, and colourless.

LEWES GASLIGHT COMPANY.

The Annual General Meeting of Shareholders was held on Monday, Aug. 14.—Mr. E. Morris in the chair.

The Clerk (Mr. Hillman) read the following report of the directors:—

The directors have much pleasure in submitting their annual report, and congratulate the shareholders upon the satisfactory result of the transactions of the year.

The balance of £2287 1s. 6d., as shown by the statement on the other side, is the profit for the year, and there is a balance on the dividend account amounting to £485 7s. Of this sum the directors certify that £1697 may be divided among the shareholders, being a dividend at the rate of £10 per cent. per annum (3 per cent. having been already paid on account thereof), that £400 be added to the reserve, and that a further sum of £190 1s. 6d. be retained on the dividend account.

The directors are of opinion that it is now necessary to make extensive alterations and improvements in the buildings, and additions to the plant. During the last year the directors have not done any repairs except those absolutely necessary, and have reduced their expenditure to the lowest possible point; consequently, the balance shows an increased profit on ordinary years. The projected alterations and additions will place the company's works in a satisfactory condition.

The directors consider it would be an advantage to discharge the present loans, and they recommend that the capital be increased to £30,000.

The directors have convened a special meeting of the shareholders (to be held at the close of the present meeting), to consider the preceding recommendation.

The directors have had much pleasure in voting a gratuity of £25 to their manager, Mr. John Hammond, as a proof of the satisfactory way in which he has managed the company's works.

There have been fourteen meetings of the directors since their election, of which Messrs. E. Morris and C. Parsons have attended all; Messrs. J. L. Parsons and John Bates, thirteen; Messrs. R. Crosskey and James Broad, twelve; Mr. C. R. Kemp, nine; and Mr. W. Farnes, eight.

The accounts appended to the report showed the share capital of the company to be £16,970, and loans on bond £3500. The revenue account for the year showed on the debtor side a total of £7154 9s. 11d., leaving a balance of £2887 1s. 6d. The balance-sheet to date above named showed—On the debtor side, shareholders capital, £16,970; loans, £3500; the reserve, £2000; amount retained on dividend account, £485 7s.; and balance of revenue account, £2287 1s. 6d., giving a total of £25,373 11s. 3d. On the credit side was—By plant, £17,199 0s. 8d.; buildings, £2218 18s. 5d.; land, £1700 19s.; stock-in-trade, £1318 16s. 4d.; debts, £1660 11s. 2d.; and *ad interim* dividend, £509 2s.

The Chairman, in moving the adoption of the report, briefly commented upon the principal topics contained in it, and said he thought the shareholders would agree with him that the directors were justified in congratulating the meeting on the success of the company.

Mr. C. Parsons seconded the motion.

The Chairman, at the request of Mr. Godlee, referred to the alterations proposed to be made at the works. He explained that they consisted chiefly of an enlarged condenser, an improved washer, and new scrubber; also an additional tar tank. Beyond this the directors proposed the enlargement of the chemical works, with some additions in the registering department. He thought it would be reasonable for the shareholders to conclude that an addition was necessary to the chemical works of the company, which in the first place were constructed in a somewhat temporary way, more as an experiment than with a view to permanency. The directors had now arrived at the conclusion that the satisfactory result which had been realized in this respect justified them in recommending chemical works of a different and enlarged character, and it was their belief that the adoption of their recommendation would be of benefit to the company. He, perhaps, ought to say that it was calculated some larger outlay would be necessary for a future time, because the works of the company were not extensive enough for the work they had to do, but it was not contemplated to carry into effect the proposed alterations immediately. The cost of the latter he estimated at about £1000.

Mr. Lenny, referring to the paragraph in the report respecting a gratuity to the manager, said he thought it was extremely satisfactory, both to the directors and the shareholders, to have such a manager as they had now. He had never had the pleasure of seeing or knowing Mr. Hammond, but he must say, as a consumer, that the inhabitants of the town had not, certainly for the past 20 years—he thought he might go back to 30 years—been supplied with such pure gas as they had since the present manager had been in office, and he could not help expressing his gratitude, and congratulating the company in possessing such an able man.

The report was then adopted.

On the motion of Mr. Godlee, seconded by Mr. J. L. Parsons, a dividend of 10 per cent. upon the capital of the company was declared, less the amount already paid as *ad interim* dividend.

Mr. Green thought that the fact of nothing appearing in the report relative to a reduction of the price of gas at a future time would cause dissatisfaction to the public.

The directors were reappointed for the ensuing year, at a remuneration of 100 guineas, and the auditors with a remuneration of 10 guineas.

Mr. Blaker, an auditor, returned thanks for himself and Mr. Lambe. He said it was satisfactory to find the affairs of the company in so prosperous a condition, and the duties of the auditors were considerably lightened by the very neat and accurate manner in which the accounts were kept. He expressed the pleasure of himself and colleague to resume office.

Mr. John Hother moved that a vote of thanks be given to the directors for their past services.

Mr. Godlee had great pleasure in seconding the motion, observing that he could speak to it rather more freely, from the fact of his having, in one way or another, been connected with the company for 50 years. He could also agree with what Mr. Blaker had said respecting the accounts, which were extremely well kept, and he was also perfectly well satisfied with the manner in which the directors performed their duty.

The motion having been adopted, the Chairman acknowledged the compliment on behalf of the directors, remarking that it was a fresh proof of the shareholders confidence in them. It was true their duties were of an onerous character, and at times occupied a great deal of time and attention, but they felt a pleasure in attending to the affairs of the company, as much, perhaps, from local circumstances as from any other cause. He hoped the prosperity of the company would continue. In conclusion, he asked Mr. Green if he wished to say anything in respect to the question of reducing the price of gas.

Mr. Green said he would leave the matter in the hands of the meeting. As far as the general public, however, were concerned, it would be some relief to them if the price was reduced.

The Chairman observed that the matter had engaged the attention of the directors, but they did not think this was the proper period to make a proposition of this kind, considering they had large works in contemplation, and they wished to try the effect of them before they made a reduction in the price of gas. They felt more justified in adopting this course, inasmuch as he believed it would be found that there was no town in England—at any rate in the southern part of the country—where the price was lower than in Lewes, according to the population. The directors felt justified under existing circumstances in continuing the present price, but nothing would give them greater pleasure in proposing a reduction if they saw fit.

The meeting was then made special, for the purpose of sanctioning certain alterations in the existing regulations of the company.

The Chairman said the matter had engaged the careful and close attention of the directors for some considerable time, and they thought it desirable that, in the position in which the company now stood, the loans should be entirely discharged, and the amount of the capital of the company increased. To pay for the whole of the loans it was necessary they should issue fresh shares. They had 606 B shares unissued under powers given them at the previous meeting, but this number would not be enough to pay for the loans; and the directors thought that as they were taking powers to increase the means of the company to pay off the loans, they should at the same time take powers to put themselves in a position to carry out any alterations and additions that were necessary, as it certainly was their opinion there must be a further expenditure, and other shares must be called for that purpose. The result of that would be that they should have to pay a dividend on a larger capital, and the directors would try the effect of that before they attempted to raise the price of gas. The directors thought it necessary to increase their capital so as to make it £30,000 instead of £20,000.

A formal resolution for carrying out these objects was proposed by Mr. Crosskey, seconded by Mr. Kemp, and agreed to.

Mr. C. Parsons, in highly complimentary terms, proposed a vote of thanks to the chairman for presiding. With regard to the observations that had been made as to the price of gas, he thought that, as the works were being carried on under a very able manager, some day the price might be reduced—he hoped so, at any rate.

Mr. Lenny seconded the motion, which was carried by acclamation.

The Chairman, in acknowledging the vote, said he felt that the remarks of his friends had been too flattering to him personally; but whatever energy he possessed he should be pleased to devote, as he had hitherto done, to benefit the company in his capacity as a director.

The meeting then terminated.

GRANTHAM WATER-WORKS COMPANY.

The Half-Yearly Meeting of Shareholders was held on the 10th inst.—Mr. Lawrence Ridge in the chair.

The following report was presented:—

The directors beg to lay before you the accounts for the half year ending the 30th of June, which show a sum of £1998 12s. 7d. upon the revenue account available for dividend.

It is proposed to apply £1925 of the above sum to the payment of a dividend at the rate of 7 per cent. per annum upon the old capital of £25,000, and 7 per cent. for the half year, January to June, upon the new capital of £5000, which will be payable on Friday, the 11th inst., leaving a balance of £73 12s. 7d. to be carried forward to the next account.

Your directors have great pleasure in reporting the completion of the erection of their new engine at Salter's Ford, which has commenced working to-day. It is a great satisfaction to them in being able to state that they are much pleased with the very efficient manner in which the whole of the work has been carried out by their engineer, Mr. Teague.

In conclusion, your directors think it prudent to notice a fallacy which exists in the minds of some of the public, that a portion of the water supply to the town is taken from the river Witham, and to assure them that such is not the case, pure spring water only being pumped from the company's reservoir.

The statement of accounts from Jan. 1 to June 30, 1876, was received, the capital account being as follows:—

Receipts.			
To amount of paid-up capital, in shares of £10 each . . .	£25,000	0	0
To amount paid upon new capital, in 500 shares of £10 each, bearing dividend from January, 1876	5,000	0	0
To balance	233	9	9
	£30,233	9	9
Payments.			
By amount expended as per statement, Dec. 31, 1875 . . .	£28,347	13	0
By extension and maintenance of works	1,885	16	9
	£30,233	9	9

In the revenue account the receipts amounted to £2881 19s. 8d., and the payments to £883 7s. 1d., leaving a balance in favour of the company of £1998 12s. 7d. The amount of water-rental for the half year ending June, 1876, was £1722 8s.

The report and accounts were adopted.

The *Lincolnshire Chronicle* says: "On Thursday the directors of the Grantham Water-Works Company, together with a few gentlemen who were interested in the undertaking, met at Salter's Ford to inspect the new engine which has just been completed, and which started working on that day. The whole of the work has been carried out under the very able direction of Mr. Teague, who in the engineer to the company. The engine is what is termed a Cornish pumping beam engine of 51-horse power, capable of being worked up to 70. It has a 7-feet pump, with 8-feet cylinder, and will pump 700 gallons of water per minute. There are two boilers, with one furnace each. The machinery and fittings were thoroughly examined by Mr. Teague upon the present occasion, and pronounced as being perfectly satisfactory and highly creditable to the manufacturers. The engine-house is a fine building of three storeys, built of red brick with stone facings. The boilers are placed on the ground floor in a lofty apartment by themselves, the engine-house being entered from the outside by stone steps. The interior has a very pleasing appearance, the walls being of a French grey colour, blending very nicely with the columns supporting the engine beam. The engine and boiler house have been built by Mr. Brewin, builder, Grantham, and the work has been done by him in a most substantial manner, and meets with the entire approbation of the directors."

Tredegar Water Supply.—It is stated to be the intention of the Tredegar Iron Company to enlarge the present reservoir near the union, so that a greater quantity of water can be stored in the event of such another season as the present.

LIVERPOOL UNITED GASLIGHT COMPANY.

On the 13th of April last Mr. P. B. M'Quie, public accountant, was appointed by the Recorder of Liverpool, under the provisions of the Gas-Works Clauses Act, 1847 (10 Vict. cap. 15, sec. xxxv.), to examine the accounts and ascertain the actual state and condition of the Liverpool United Gaslight Company. Mr. M'Quie's report has just been issued, and will, we presume, come before the next quarter sessions for consideration. The report is as follows:—

Sir,—In accordance with the instructions conveyed to me under my appointment, dated April 13, 1876, "to examine the accounts and ascertain the actual state and condition of the Liverpool United Gaslight Company, and to report to you," I have the honour to submit for your perusal and consideration the result of my investigation, together with various summaries extracted from the books of the company, and compiled by me to illustrate the economy of its management.

Under the 35th section of the Act of 1847, my duty appears primarily to have reference to the accounts of the preceding year—viz., 1874-5, so far as the profits of that year and their appropriation are concerned; but after a careful perusal of the section referred to, I have taken a more comprehensive view of the duties involved in my appointment, for I consider that "to examine and ascertain the actual state and condition of the concerns of the undertakers" implies a retrospective investigation, so as to inform and satisfy my own mind thereupon. But, apart from this, it appears to me consistent with my duty, and a part of it, to report to you upon the whole, not upon a sectional portion of the accounts; and were I to confine my inquiry simply to the profit and loss account of the year in question, I should leave the capital untouched.

The printed statements submitted to me purport to set forth the state of the "Capital Account," "Dividend Account," "Reserve Fund," and "Profit and Loss Account" of the company, for the year ending 30th June, 1875.

Therefore my report will have reference to these accounts in the order in which they have been submitted.

1.—CAPITAL ACCOUNT.

As respects this account, the receipts and expenditure, as shown by the books of the company, do not in my judgment correctly represent its actual condition.

My investigation has necessarily been a retrospective one, and the result proves conclusively to my mind that large sums have, from time to time, been charged against the income of the company which ought properly to have been charged against capital account.

I submit the following for your consideration and further inquiry:—

1. *Items referred to in Mr. H. C. Beloe's Reports, incorrectly Charged against Income.*

Per reports March 26, 1866, and April 11, 1867—		
Parliamentary expenses—		
Costs of obtaining Act of 1865, authorizing an increase of capital	£2,730 19 11	
	161 11 1	
		£2,892 11 0
Per report May 5, 1864—		
Loss on re-sale of land, Egerton Street	£2,562 3 8	
Per report April 11, 1867—		
Less, profit on re-sale of land, Sandhills	1,422 17 0	
		1,139 6 8
Per report June 19, 1865—		
Gasholders, Nos. 4 and 5, Athol Street, £3500		
The cost of these gasholders was	£7,099 13 8	
I deduct the moiety charged against Egerton Street station account (owing to an accident), less credit	2,861 0 9	
		4,238 12 11
Per report Feb. 12, 1858—		
Main pipes account.—Cost of re-laying mains in Aigburth and Bootle.		
Aigburth Road—		
Value of 15-inch pipes laid in place of 8-inch and 7-inch pipes taken up.		
Pipes laid	£2,028 15 8	
Pipes taken up	679 0 10	
		1,349 14 10
Bootle—		
Value of 18-inch pipes laid in place of 8, 7, and 6-inch pipes taken up—		
Pipes laid	£4,443 19 10	
Pipes taken up	1,438 5 2	
		3,005 14 8
		£12,626 0 1

The total cost of relaying the above mains, and charged against profit and loss, was as follows:—

Aigburth new pipes	£2028 15 8	
Wages and labour, &c.	650 5 2	
	£2679 0 10	
Less, credit for old pipes	681 5 7*	
	£1997 15 3	
Bootle new pipes	£4443 10 9	
Wages and labour	1158 4 10	
	£5601 15 7	
Less, credits for old pipes	1438 5 2*	
	£4163 10 5	

* At prices at which they were laid.

It will be observed that I have not included labour expended in the renewal, and only seek to debit capital with the difference in value between the new pipes laid and the old ones taken up.

The foregoing, I think comprise the items objected to by Mr. H. C. Beloe, and I must be understood to concur in his objection.

MAIN-PIPES ACCOUNT.

The next items I submit for your consideration and further inquiry are certain transfers from main-pipes account to debit of profit and loss account, to which I object on the ground that they are fairly chargeable against capital account.

The expenditure on main-pipes account has been kept under two separate ledger accounts:—

1.—*District main-pipes account* (capital).
2.—*Repairs and alterations of main-pipes account* (income).

The district main-pipes accounts are debited with the pipes supplied from the stock account, the cost of laying same, &c, &c.; and the total expenditure at the end of each financial year has usually been transferred to the debit of capital account.

Up to, and inclusive of, the years 1868 and 1869 the system was carried out in its integrity; but in the year 1869-70, and during succeeding years, a considerable portion of the expenditure was charged against income.

Assuming the classification to have been correct in the first instance, and upon inquiry, and also upon reference to the departmental books, I have every reason to suppose that it was so; I can only come to one conclusion, and that is, that these transfers were arbitrary and incorrect.

They are as follow:—

Year 1869-70—		
Toxteth Park	£1514 1 6	
West Derby	186 0 0	
Garston	420 5 8	
Allerton	741 3 4	
Walton	635 9 4	
Bootle	1514 0 8	
		£5011 0 0
Year 1870-71—		
Borough	£341 1 0	
Toxteth Park	1257 9 3	
West Derby	161 9 6	
Everton	148 7 4	
Kirkdale	134 14 5	
Garston	118 3 3	
Allerton	559 6 3	
Wavertree	617 0 2	
Walton	87 2 0	
Crosby	37 10 10	
Bootle	788 2 2	
Litherland	163 16 2	
		£4414 4 4
Year 1871-2—		
Borough	£672 11 5	
Toxteth Park	1,135 5 8	
West Derby	535 18 1	
Everton	39 15 6	
Kirkdale	236 0 3	
Garston	138 17 11	
Allerton	7 8 10	
Wavertree	51 17 2	
Walton	115 11 7	
Bootle	679 10 4	
Litherland	161 9 7	
Crosby	20 19 4	
		£3,815 5 8
Year 1872-3—		
Borough	£3,661 13 3	
Toxteth Park	2,167 14 10	
West Derby	1,202 3 3	
Everton	94 11 3	
Kirkdale	899 10 8	
Garston	52 0 0	
Allerton	27 9 11	
Wavertree	17 11 2	
Walton	85 4 1	
Bootle	33 3 3	
Litherland	27 0 10	
Crosby	9 18 0	
		£8,278 0 6
		£21,518 10 6

In addition to the foregoing items I find a heavy expenditure for 24-inch pipes (from Robert MacLaren and others), used at Bootle and Wavertree. The amount has been charged direct to repairs account instead of passing through main-pipes stock account. The information I have obtained upon this matter does not enable me conclusively to charge the amounts against capital; at the same time I submit to you that it may transpire, upon official inquiry, that a portion, if not the whole, of the amount shall be so charged.

The items referred to are:—

Years 1863-4—		
Robert M'Laren, 24-inch pipes	£180 9 7 1062 10 8 685 15 1	
		£1928 15 4
Years 1864-5—		
Robert M'Laren, 24-inch pipes	£1253 0 3	
George Forrester and Co., syphon	646 5 4	
		£1,899 5 7
		£3828 0 11

MAIN SERVICE-PIPES ACCOUNT.

As in the case of the main-pipes account, the expenditure on capital account has been kept entirely distinct and separate from "repairs of service-pipes account."

The ledger account is debited with transfers from the various district service-pipes accounts, which include labour, pipes taken out of stock of fittings, &c., &c., and also with transfers from the various district lamps accounts, and with payments to the health and water committees of the borough for paving, &c.

This ledger account was formerly closed annually by a transfer to the debit of capital account through pipe distribution account.

The exceptions to this system I object to, and submit for your consideration and further inquiry.

I find that capital account was regularly charged up to, and inclusive of, the years 1855-6.

In the year 1856-7 up to, and inclusive of, the year 1861-2, only one moiety of the cost was charged against capital, and the other moiety was charged against income (an exception occurred in the year 1858-9, when the whole expenditure—£1,721 10s. 10d.—was charged against capital). From and after the year 1861-2 the entire cost of service-pipes and laying was charged against income.

I may observe that the service-pipes alluded to are those which convey gas from the main-pipes to the boundary line of private properties, and, in my judgment, are as essentially an outlay on capital account as the main-pipes themselves.

The following items are those which, in my judgment, have been improperly debited to income account:—

Main Service-Pipes charged against Income.

1855-6—moiety	£832 8 3	
1857-8 "	841 7 8	
1859-60 "	874 5 10	
1860-1 "	752 5 8	
1861-2 "	764 4 7	
	£4,064 12 0	
1862-3—the whole	1,596 5 1	
1863-4 "	1,972 2 11	
1864-5 "	2,076 1 8	
1865-6 "	2,327 2 11	
1866-7 "	2,131 5 11	
1867-8 "	2,001 8 3	
1868-9 "	2,134 4 11	
1869-70 "	1,803 18 0	
1870-1 "	1,771 7 7	
1871-2 "	1,948 4 3	
1872-3 "	1,984 10 11	
1873-4 "	1,588 10 6	
1874-5 "	1,432 1 9	
	£28,831 16 8	

Upon reference to the analysis of expenditure on capital account in the

Appendix it will be seen that there has been no increased outlay on account of service-pipes.

Independently of the foregoing items, a very large amount has been charged against income for ordinary repairs of main service-pipes and lamps.

In the Appendix I submit details of these charges in each year, as per following summary:—

Repairs and alterations of main-pipes—		
Charged against income, 1856-7 to 1874-5		£117,438 11 9
And inclusive of items which are chargeable, in my judgment, to capital account	£21,518 10 6	
Mains, Bootle and Aigburth—		
Aigburth	£1,349 14 10	
Bootle	3,005 14 8	
	4,355 9 6	
	£25,874 0 0	
Repairs, service-pipes account—		
Charged against income, 1856-7 to 1874-5		£80,994 15 7
And inclusive of the foregoing items, chargeable, in my opinion, to capital account	£28,831 16 8	
Repairs, public lamps—		
Charged against income, 1856-7 to 1874-5		£16,790 16 2

The next items to which I take exception are those which pertain to the "Manufacture of Meters." A separate account appears under this head in the ledger, and it shows an annual profit; nevertheless, profit and loss account has never been credited with it.

Meter Account.

From June, 1848 to 1868, meter account was debited with the value of meters made, and credited with the value of old meters condemned as useless (and taken into stock at the price at which they were issued), leaving a balance representing the amount of additional capital invested in meters.

The company, however, annually reduced the balance chargeable against capital, by appropriating the profits arising from their manufacture as shown in the manufacture of meters account, which profits ought, in my judgment, to have been credited in the general profit and loss account.

I submit the items under this head for your consideration and further inquiry; they are as follow:—

An Account of Profits arising from the Manufacture of Meters credited to Meter Account instead of to Profit and Loss, as per Ledger Account.

1848-9	£632 0 4
1849-50	30 16 5
1852-3	800 0 0
1853-4	1,416 9 1
1854-5	1,496 3 1
1855-6	966 15 2
1856-7	917 4 6
1857-8	1,107 11 2
1858-9	1,156 3 4
1859-60	2,378 9 5
1860-1	613 14 3
1861-2	1,802 11 10
1862-3	152 1 7
1863-4	1,467 4 8
1864-5	2,367 6 8
1865-6	1,595 4 2
1866-7	1,073 4 1
	£20,022 19 9

In addition to the foregoing items there have been the following transfers from the meter account to the debit of repairs of meter account, by which the balance chargeable to capital account has been still further reduced. In my opinion such transfers were arbitrary and incorrect:—

1859-60	£600 0 0
1862-3	1,158 7 2
1863-4	2,842 15 4
1864-5	2,000 0 0
1867-8	2,493 17 4
	£9,094 19 10

From and after the year 1867-8, the value of meters manufactured was omitted altogether from the books, the manufacturing account being no longer credited with the meters manufactured; and consequently there was no longer any profit shown on this account. On the contrary, a debit balance had to be disposed of each year, and it was transferred to debit of the repairs of meters account, and from it to debit of profit and loss account as follows:—

1868-9	To debit of repairs account	£3,110 16 7
1869-70	,, ,,	112 14 7
1870-1	,, ,,	705 18 0
1871-2	,, ,,	2,304 13 7
1872-3	,, ,,	2,786 7 2
1873-4	,, ,,	1,519 16 0
1874-5	,, ,,	2,414 8 4

I propose now to give profit and loss account credit for the amount of meters manufactured, less the value of the condemned meters taken into stock.

Value of meters made during the following years (less discount 12½ per cent.):—

	Meters.		
1868-9	929	£3,358 10 0*	
1869-70	471	1,479 2 2	
1870-1	608	1,878 16 2	
1871-2	717	2,440 3 2	
1872-3	910	2,808 8 0	
1873-4	992	3,039 10 8†	
1874-5	922	2,997 1 11‡	
	5549		£18,001 12 1

Less value of meters condemned, and taken in at the above prices (less 12½ per cent.)—

	Meters.		
1868-9	614	£1,389 3 0§	
1869-70	52	129 13 2	
1870-1	164	293 13 11	
1871-2	268	456 18 0	
1872-3	47	100 12 6	
1873-4	170	341 19 0	
1874-5	114	230 5 1	
	1429		2,942 4 8
			£15,059 7 5

* Should be £2038 13s. 9d. † Should be £2890 15s. 8d.
‡ ,, £2909 11s. 11d. § ,, £1215 10s. 2d.

I have not yet been able to ascertain the number of meters out on rental.

Upon reference to the analysis of expenditure on capital account it will be seen that there has been no addition to the outlay in meters.

New Offices, Duke Street.

The next items to which I desire to call your attention are comprised in the expenditure in building, fitting, and furnishing new offices, Duke Street, Liverpool.

The entire cost, as shown by the books, is as follows:—

	Land.	Buildings.	Furnishing.
Ledger F, 166.—	£18,062 10 0		
,, G, 157.—Contract		£18,889 2 10	
,, G, 157.—Sundries		821 5 2	
,, G, 157.—Admrs. Lucy		985 0 0	
,, F, 168.—Sundries		1,246 1 5	
,, G, 159.—		..	£3,760 16 6
,, F, 297.—		...	1,794 19 4
,, G, 157.—		801 10 0	
,, G, 160.—		282 4 5	194 2 4
	£18,062 10 0	£22,025 3 10	£5749 18 2
Total cost. . .			£46,837 12 0

Charged as under:—

Capital account—		
Land	£18,062 10 0	
Buildings	24,997 5 3	
	£43,059 15 3	
Profit and loss account.		
Repairs, buildings account—		
Transfer	£801 10 0	
,,	282 4 5	
,,	194 2 4	
Fitting account	2,500 0 0	
	£3,777 16 9	

Of the sum of £3777 16s. 9d. charged against profit and loss, I take exception to the following items:—

Fitting account	£2500 0 0	
Chatwood's safe	239 6 6	
Force-pump	81 19 8	
Sundries	92 17 10	
		£2914 4 0

Connecting-Main Between Caryl Street and Athol Street Stations.

The construction of this main, to connect Caryl Street and Athol Street stations, is now finished; and, from inquiry I have made, I understand it is entirely new work. The cost of construction, as shown by the books on June 30, 1875, is as follows:—

Wages	£3 13 3
Pipes (R. M'Laren & Co.)	2181 5 6
Ditto (stock account)	4187 18 8
	£6372 17 5

Of this amount the sum of £4187 18s. 8d. appears at the debit of repairs and alteration of main-pipes account, and has been charged to profit and loss in the account of June 30, 1875, the balance being carried to the current year's account.

To this item I object, and for the reasons above named.

Upon inquiry, I have been informed that the labour expended in its construction has been charged in the main-pipes account, and from it to capital.

Eccles Street Station.

A large amount has been expended in the reconstruction of Eccles Street station. The works, if I am rightly informed, were originally the property of the Liverpool Gaslight Company, and were included in the assets taken over by the new company at the time of the amalgamation in 1848.

The books of the present company do not indicate the value at which the works stood in the old books; but, should any inquiry arise upon my objection, a reference to them would determine the original cost.

The original works consisted of six small gasholders, capable of holding about 600,000 cubic feet of gas, with the retort-houses and other workshops and buildings necessary for the business. These, with the exception of the retort-houses on the west side of the yard, have been entirely demolished, and in place thereof the company have erected one large gasholder, capable of containing 800,000 cubic feet of gas, and substantial offices and workshops on the south side of the yard, along the side of Eccles Street.

The entire cost will be considerable, but it will not appear until the books are closed, on June 30, 1876.

In the meantime, and up till June 30, 1875, the following items on account of reconstruction appear in the books:—

New tank		£1917 17 8
New governor		2386 3 1
New governor-house		1043 10 10
New gasholder		159 1 5*
Repairs and alterations of apparatus account—		
Wages	£254 16 4	
Sundry accounts	286 11 0	
On account	2500 0 0	
		3041 7 4
Repairs and alterations of buildings account—		
Roberts and Co.	£9 1 2	
On account	2500 0 0	
		2509 1 2
		£11,057 1 6

* The contract for the holder is £9500, but it will not appear in the books until June 30, 1876.

Of this amount, the sum of £5550 8s. 6d. has been charged against profit and loss for the year ending June 30, 1875.

There is no doubt in my mind that a considerable proportion of the outlay will be properly chargeable against revenue, the company having no depreciation-fund to fall back upon for extraordinary repairs and alterations, and other contingencies; but I think that when it is found necessary to incur any extraordinary and heavy expenditure of this nature the portion chargeable against income should be distributed over several years, so as not to burden unduly any one or two years with the whole.

In this case, I am of opinion that the proportion of the outlay chargeable against capital should be the difference in excess, if any, between the value of the land, plant, and buildings left standing (taken at their original cost) *plus* the recent outlay in reconstruction, and that amount at which the works were taken over by the new company in 1848 (which was, in fact, the cost at which they stood in the old books) *plus* the subsequent outlay on the capital account to the date of their partial demolition.

The outlay on these works, from the year 1848 to the date of their partial demolition, as shown by the books and charged against capital, was as follows:—

1849	..	Mortar mill		£147 11 7
1850	..	Pressure regulator		57 15 8
1851-2	..	Paving Eccles Street		187 10 11
1854	..	Retort-houses	£1923 11 7	
		Chimney	161 1 5	
		Retort arches	1981 6 8	
		Workshops	504 3 2	
				4570 2 10
1862	..	Connecting-mains		1594 4 11
1872	..	Houses, Eccles Street		394 15 8
				£6,952 1 7

Summary.

The following is a summary of the items referred to in the foregoing pages, and which, in my judgment, are either partly or wholly chargeable against capital, but which have been charged by the company against profit and loss:—

1. Items referred to by Mr. H. C. Beloe in his reports		£8,270 10 7
2. Ditto, £4000		4,355 9 6
3. Main-pipes, transfer to profit and loss		21,518 10 6
4. Ditto, extraordinary outlay	£3,828 0 11	
5. Main service-pipes		28,831 16 8
6. Meter account—		
Profits on meters	£20,022 19 9	
Transfers to repairs account	9,094 19 10	
Meters manufactured	15,059 7 5	
		44,177 7 0
7. New offices, Duke Street		2,914 4 0
8. Connecting-main, Caryl Street		4,187 18 8
9. Eccles Street station	£5,550 8 6	
		£114,255 16 11

2.—RESERVE-FUND.

The effect of the surcharges upon the income of the company has been to absorb any surplus which might have been available for the reduction of the price of gas to the consumers.

The following statement will show the position of the reserve-fund on June 30, 1875, when a balance of £1812 14s. 3d. was all that remained at its credit:—

				Reserve-Fund at Credit, and its Accumulations.			
				July 1, 1848.			
Payments on account of dividend, 1848	£4,955	15	5	Balance at credit of Liverpool Gaslight Company	£5,193	14	1
Loss on Consols	630	6	11	New Gas Coke Company.	3,854	19	9
	£5,586	2	4				
Aug. 23, 1849.							
Loss on Consols. £537 12 10							
Transfer to dividend account. 2,924 18 8							
	3,462	11	6				
	£9,048	13	10		£9,048	13	10
					Interest on Consols.	Transfers from Profit and Loss.	
Transfer to credit of dividend account to make up statutory deficiency—				June 30, 1853	..	£2,046	0 9
				,, ,, 1854	£26 17 10	..	
				,, ,, 1854	..	8,433	1 7
Aug. 27, 1856	£1,335	7	0	Sept. ,, 1854	29 16 8	..	
,, 16, 1859	5,599	11	1	June ,, 1855	29 16 8	3,328	1 6
,, 21, 1860	3,672	2	6	,, ,, 1857	345 16 0	660	18 0
,, 27, 1867	10,439	7	7	,, ,, 1858	407 5 4	587	14 1
Feb. 18, 1868	5,367	17	0	,, ,, 1859	441 18 2	..	
Transfer to profit and loss.	943	3	7	,, ,, 1860	372 4 0	..	
Aug. 22, 1873. Loss Consols	28	13	10	,, ,, 1861	234 14 8	5,166	17 8
,, ,,	18,677	4	8	,, ,, 1862	268 11 0	4,124	5 10
,, 21, 1874	1,379	9	7	,, ,, 1867	504 15 2	..	
				,, ,, 1868	348 13 0	..	
				,, ,, 1870	..	7,894	19 6
	£47,442	16	10	Aug. 16, 1871	..	8,360	3 5
Balance	1,812	14	3	June 30, 1872	456 16 5	2,552	19 8
				,, ,, 1873	513 2 2	..	
				Aug. — 1873	308 12 4	..	
				,, 31, 1875	..	1,811	8 10
					£4,289 0 3	£44,966	10 10
				Interest.		4,289	0 3
	£49,255	11	1			£49,255	11 1
				Aug. 31, 1875. Balance		£1,812	14 3

The statutory dividends of 10 per cent. per annum on £561,000 have been paid to the proprietors in full, with the exception of the half-yearly dividend due Dec. 31, 1873, and payable in Feb., 1874, which was declared at the rate of 7 per cent. per annum, in place of 10 per cent., leaving a balance of £8415 due and owing to the proprietors. The amount is still unpaid, and will be a first charge upon the reserve-fund, whenever such fund is capable of meeting the demand.

The Act of 1848 provides that the reserve-fund "shall be equal in amount to a per centage of three pounds for every one hundred pounds of capital then raised by the company." (See sec. 38.)

Under the Act of 1865, the company obtained powers to increase their capital by the creation and issue of shares, amounting in the aggregate to £300,000; but there is no provision therein authorizing a corresponding increase in the reserve-fund.

I submit the point for consideration whether the company, in the absence of any prescribed rate for an increase of the reserve, consequent upon the additional capital subscribed (amounting, on June 30, 1875, to £169,180), will not have to fall back upon the clauses in the Act of 1847, sec. 31.

This point may be of some importance herafter.

3.—DIVIDEND ACCOUNT.

In the year ending June, 1873, the nett profits of the company were only £43,154 14s. 4d., and the amount at the credit of the reserve-fund was £19,778 1s. 2d.; from this amount the sum of £18,677 4s. 8d. was withdrawn to make up the following dividends:—

On consolidated stock—£561,000, 10 per cent.		£56,100 0 0
On 5459 shares—£15 paid up, £81,885, 7 per cent.		5,731 19 0
		£61,831 19 0
On old stock—£561,000 at £6-712 per cent.		£37,657 0 0
On new capital—£81,885 at £6-712		5,497 0 0
		£43,154 0 0

A doubt has arisen in my mind upon the correct interpretation of the clause in the Act of 1865, referring to the rate of profits to be divided among the proprietors of the new capital, (see sec. 7), as follows:—

"The prescribed rate of profits to be divided among the shareholders shall, as regards the shares to be issued under this Act, be seven pounds on the hundred pounds by the year, on the amount for the time being paid up on those new shares."

If the clause quoted is to be interpreted as prescribing a preferential dividend of 7 per cent. per annum, payable out of the nett profits, I can understand that the amounts of such dividend would be properly deductible from such nett profits before the rights of the old shareholders are considered at all, and should the balance be insufficient to provide the statutory dividend of 10 per cent. payable upon the old capital, then the company would have an undoubted right to fall upon the reserve-fund for the total deficit; but if, on the contrary, the clause simply prescribes a maximum dividend not exceeding 7 per cent., payable on the new capital subscribed, I submit that the total nett profits of the company must be applied, as far as they go, to provide an equal dividend upon the general capital of the company, not exceeding 7 per cent., the surplus being available for the statutory dividend of 10 per cent., payable on the old capital, and the deficit, if any, a charge upon the reserve.

The profits, therefore, of 1873, amounting to £43,154 14s. 4d. should have been distributed as follows:—

The deficiency to be made up in respect of the old stock, and payable out of the reserve-fund would, in such case, have been £18,443, in place of £18,677 4s. 8d., the amount withdrawn and appropriated; therefore, the sum of £234 4s. 8d. has been overdrawn from the reserve-fund.

This, at first sight, may appear a very small matter, but the principle to be established is an important one; for I do not consider that it was contemplated under the Act of 1865 to make the reserve-fund available for any deficiency in dividends on the 7 per cent. capital.

The point raised might be even carried further, if the dividend of 10 per cent. on the old stock is to be first provided for out of the nett profits. In such case the reserve could only have been drawn upon for the deficit in 1873, to the extent of £12,945 5s. 8d. I do not, however, support this view of the case.

4.—PROFIT AND LOSS ACCOUNT.

The profit and loss account for the year ending June 30, 1875, contains several items already commented upon and objected to in this report; with those exceptions, I have every reason to subscribe to its general accuracy.

The exceptions referred to are the following, which, in my judgment, are chargeable against capital account, and with which income account should be credited:—

Main service-pipes		£1,432 1 9
Connecting-main, Caryl Street and Athol Street		4,187 18 8
New offices		..
Eccles Street station	£5,550 8 6	
Omission in not crediting meter account—		
Value of meters made	£2,997 1 11	
Less, meters taken into stock	230 5 1	
	2,766 16 10	
		£8,386 17 3

In the Appendix I submit a more detailed statement, showing the expenditure for the year 1875, and income account for the year 1875.

I also submit comparative statements of the income and expenditure for the years 1869-70, 1870-1, 1871-2, 1872-3, 1873-4, 1874-5, with a complete analysis of the company's business during those years. I do not consider it a part of my duty to offer any comment upon the economy of the company's management, as shown by these statements; the figures submitted will, however, enable you to form a correct judgment upon this matter.

Gas Fittings Account.

On Feb. 17, 1876, a company, named "The Liverpool Gas Fittings Company Limited," was formed, with a nominal capital of £10,000, divided into 10,000 shares of £1 each, to carry on the business of gas fitters, &c., and to take over the fitting business of the Liverpool United Gaslight Company, on such terms as may be agreed upon. This operation will prove to be one of grave import to the gas consumers, as a large annual profit has hitherto accrued to the gas company from the fitting department.

Profits on Fittings Department.

1869-70	£3,068 10 10
1870-1	3,375 12 0
1871-2	3,240 3 5
1872-3	4,526 8 5
1873-4	4,568 18 3
1874-5	2,858 18 6

The question of goodwill to be paid by the new company will naturally arise when the accounts for the current year, ending June 30, 1876, are the subject of inquiry.

Damage to Landing-Stage.

The compensation for damage done to the landing stage, and payable to the Mersey Docks and Harbour Board, is not an item involved in the accounts for the year ending June 30, 1875.

Deposits from Consumers.

The system adopted by the company, under the powers of the Act of 1848, sec. 49, of demanding from their consumers a deposit as security for the payment of their current accounts for gas, has materially reduced the annual loss arising from bad debts. Previously to 1868, the account of deposits in hand was kept in the gas rental books, and was considered in the light of a prepayment of the current gas bill; but in June, 1868, the deposits were scheduled and transferred to the credit of deposit account in the general ledger. I am informed that such deposits represent the estimated average of a summer and winter quarter's gas account of the respective depositors. That if the accounts rendered each quarter are regularly paid the deposit is not disturbed; if not, it is applied by the company in payment of such accounts. Occasionally balances have remained in the company's hands which have never been applied for, and these have accumulated until the total unclaimed deposits amounted, on June 30, 1875, to the sum of £1803 15s. 2d.

The total deposits at the credit of the consumers (exclusive of the unclaimed deposits) on June 30, 1875, amounted to £35,610 16s. 3d.

The Act makes no provision for payment of any interest upon the amount to the depositor, and therefore the company have never allowed any; nor have they considered it necessary to invest the money, or any portion of it, so as to keep it distinct and separate from the general assets. The proprietors have had the advantage of the money as so much working capital without interest, and also the advantage of the guarantee which it affords to them against bad debts.

The gas consumers generally may be supposed to participate indirectly in the latter advantage; but it is at the expense of the individuals from whom the deposit is exacted. There would be no hardship to the depositors if they were allowed the minimum rate of interest upon the amount deposited.

To show the advantage of the system, so far as the company is concerned, I submit a list of the bad debts incurred and written off since the company commenced business, and the amounts of deposits in hand from the year 1868 to June 30, 1875.

Bad Debts written off.						Deposits, June 30.	
1848-9 ..	£4,210	6	11	1862-3 ..	£1,593	4	4	
1849-50 ..	3,213	8	0	1863-4 ..	965	12	10	Amount on hand previously, at end of each year, not ascertained.
1850-1 ..	2,719	1	0	1864-5 ..	996	6	5	
1851-2 ..	2,081	6	0	1865-6 ..	888	9	8	
1852-3 ..	1,337	1	9	1866-7 ..	915	6	7	
1853-4 ..	1,581	0	9					Total at end of each Year.
1854-5 ..	1,670	14	4	1867-8 ..	2,075	1	6	.. £17,517 1 7
1855-6 ..	1,677	1	2	1868-9 ..	906	10	5	.. 19,978 16 7
1856-7 ..	1,965	2	2	1869-70 ..	919	4	0	.. 21,595 2 1
1857-8 ..	2,375	1	2	1870-1 ..	953	2	4	.. 24,561 4 8
1858-9 ..	1,681	19	9	1871-2 ..	888	17	3	.. 27,536 4 9
1859-60 ..	1,459	14	9	1872-3 ..	395	9	7	.. 30,212 10 2
1860-1 ..	1,499	2	2	1873-4 ..	484	14	8	.. 33,066 10 11
1861-2 ..	1,436	12	2	1874-5 ..	643	18	1	.. 35,610 16 3

I beg, in conclusion, to observe that every facility has been accorded to me by the officials of the company for fully investigating its accounts, and whenever I have required information, other than the books contain, it has been promptly and readily furnished to me by them.

I have the honour to remain, sir, your obedient servant,

P. B. M'Quie, Public Accountant.

Liverpool, July 4, 1876.

LIVERPOOL UNITED GASLIGHT COMPANY.

The Half-Yearly Meeting was held on the 15th inst., at the Offices, Duke Street—Mr. J. LISTER in the chair.

In the report the board of directors stated that the company's accounts showed the revenue for the year ending June 30 last to have been £453,485 14s. 6d., and the expenditure £382,029 1s. 3d., leaving an available surplus of £71,456 13s. 3d., from which £33,971 6s. has been taken for payment of the dividend declared last February. Out of the balance (£37,485 7s. 3d.) the directors recommended that a dividend be declared, for the half year ending June 30 last, at the rate of 5 per cent. per half year on the ordinary consolidated stocks of the company, and at the rate of £3 10s. per cent. on the consolidated B (7 per cent.) stock, and on the amount paid up in respect of the £7 10s. shares. Notwithstanding the heavy tax on the resources of the company which had been entailed by the disaster at the landing-stage, the directors now felt justified in announcing a reduction in the price of gas to the uniform rate of 4s. per 1000 cubic feet, such reduction to take effect from the 1st of October next. The manufacture of gas for the half year had cost £262,233 1s. 9d., repairs £45,196 15s. 6d., and a sum of £33,614 15s. 7d. had been paid during the year towards the company's liabilities respecting the fire at the landing-stage.

The CHAIRMAN, in moving the adoption of the report and the accounts, said that an accountant had been appointed by the Recorder recently, and his report had been presented, but as the consideration of it had been deferred until next sessions, it would be premature to say more than that the directors would be fully prepared to show, when the proper time came, that the course they had adopted had been perfectly regular, and in the interests of consumers and the public no less than in those of the shareholders. The directors regretted that circumstances had heretofore prevented them reducing the price of gas, but they were able to do so now, and they looked forward to being able to make a further reduction at no distant period.

The motion was seconded by Mr. J. A. TINNE, and carried unanimously.

On the motion of the CHAIRMAN, the dividends recommended in the report were declared, it being agreed that they should be made payable on Aug. 19.

Sir H. Earle, Bart., Mr. John Grant Morris, Mr. William John Marrow, and Mr. James Fletcher were re-elected directors, and Mr. Joseph A. D. Watts was re-elected an auditor.

A SHAREHOLDER then proposed a vote of thanks to the chairman and directors for the way in which they had managed the affairs of the company during the past year. Their work during the year had been very arduous, but he had no doubt they would be able to carry through matters with the Town Council satisfactorily.

The vote was seconded and carried, and, in reply, the CHAIRMAN said they were much obliged to the meeting for the vote, but they really deserved it.

The proceedings then terminated.

BURY ST. EDMUNDS GAS COMPANY.

The Fifty-Fourth Half-Yearly Meeting of Shareholders was held at the Works on Friday, the 11th inst.—Mr. H. TURNER in the chair.

The SECRETARY (Mr. Salmon) read the following report:—

The various new works referred to in the last report have made, and are making, satisfactory progress. The tank is approaching completion. The chimney shaft has been completed some weeks, and the directors believe it to be well done. The erection of the new gasholder and purifiers will probably have commenced by the time of the half-yearly meeting, and will be finished within the time limited by the contracts.

The directors will recommend the payment of the usual dividend for the past half year of 10s. per share on the old capital, and 4s. 2d. per share on the new capital (both free of income-tax).

Capital Account, from Jan. 1 to June 30, 1876.

Dr.				*Cr.*			
Calls on old capital	£12,000	0	0	Permanent capital to this time, as per last half-yearly account	£24,183	17	11
,, new capital	9,900	0	0				
Calls	1,800	0	0				
On account of call, due July 31	56	0	0	Repairs and additions to works since	1,405	11	11
Loan from urban sanitary authority	2,500	0	0	Balance in hand	666	10	2
	£26,256	0	0		£26,256	0	0

Revenue Account.

Balance from last account	£2,077	11	2	Wages and salaries	£759	1	7
Coke and tar	1,066	1	7	Printing, advertising, and stationery	9	9	2
Fittings and labour	135	4	0	Rates and taxes	84	5	9
Gas and meters	4,714	5	11	Petty disbursements	25	16	6
Transfer fees	1	6	6	Coals, cartage, freight, and carriage	1,511	10	5
	£7,994	9	2	Fittings	72	5	1
Accounts uncollected on Jan. 1, 1876, and since received	2,983	8	8	Ironmongery, paint, glass, and oil	1	5	0
	£5,011	0	6	Fire bricks, clay, and retorts	13	2	0
Arrears due on March 31, 1876	76	16	1	Lime and oxide	29	13	9
Accounts due to June 30, 1876, and then uncollected, as under—				Repairs	139	5	3
				Paid on account of new shaft	243	0	0
					£2,888	14	6
Coke and tar	217	10	5				
Liquor	44	16	10	Dividends due on July 1, 1876, as under—			
Gas and meters	929	15	6	On £12,000 old capital, at 10s. per share	600	0	0
Fittings and labour	30	5	10	On £9900 new capital, at 4s. 2d. per share	375	0	0
Sundries	19	14	10	Depreciation of stock	92	3	3
				Balance carried to next account	2,374	2	3
	£6,330	0	0		£6,330	0	0

The reserve-fund account to the 30th of June, 1876, showed stock purchased to the amount of £1741 0s. 7d. India 5 per cents., for which £1920 19s. 9d. has been paid.

The CHAIRMAN, in moving the adoption of the report and the payment of the usual half-yearly dividends, remarked that he thought the shareholders would be gratified by comparing this report with those of previous half years. The directors had during the past half year paid off most of the money upon the new shaft, and were still able to carry forward £300 more than they had in hand six months back: he therefore considered that the prospects of the company for the ensuing half year were very fair indeed. The new works, as far as they had been proceeded with, had given every satisfaction, and the directors hoped that in a short time they would be able to supply the town with an unlimited quantity of gas. He regretted very much that last Christmas there was a scarcity of gas, and certainly hoped the company would never labour under a similar disadvantage again.

Mr. THOMPSON, in seconding the proposition, said he thought the directors had every reason to congratulate themselves upon their present position, and upon the fact that they had the sympathy and general good feeling of all those connected with them. The secretary would tell them that not only had no shares changed hands, although there had been some heavy calls made, but nearly all of them had been paid up; and he (Mr. Thompson) thought that this was not only evidence of the prosperous position of the company, but also of the confidence the shareholders placed in the directors.

The SECRETARY, having offered the congratulations of the meeting to the chairman on his recovery from a severe illness, proceeded to comment upon the new works that were in course of construction, and alluded to the new tank, the erection of which was not accomplished without the expenditure of a large amount of money. In their present undertaking they had, by the election of their new manager, brought to bear upon it a large amount of engineering skill and knowledge. It was only fair and just to Mr. M'Crae to say that, in works about which £2000 had to be laid out, there were as a rule a good many extras, but he (the secretary) could inform them that they had paid for the tank, with the exception of 10 per cent. to provide for future contingencies, and they had not found it necessary to use all the concrete that was provided for the sides and bottom of the tank. The work was being very satisfactorily carried out by Mr. Andrews, with whom the directors worked remarkably well. With respect to the question of water, they had not at present been able to stop the powerful springs that had been opened, but Mr. M'Crae, would tell them that when the holder was put up there would be no difficulty in keeping the water in its proper place. With respect to the shaft, that had been most perfectly and satisfactorily completed without a single extra shilling being incurred over the original estimate. The condenser would be finished before next week, and there would also be no extra to pay for that. Then they would only have to fix the holders and purifiers, and as this contract was with a first-class man, they need have no anxiety about the work not being done well and properly executed. With the exception of one single instance, where a few shares were held by a gentleman as trustee, there was not a single person who had sold his shares in consequence of the fresh calls having been made. With regard to these calls, every one paid the first call, and only three left unpaid the second call, which had just become overdue. He thought such a state of things showed the growing prosperity of the company.

The motion having been carried,

The CHAIRMAN proposed a vote of thanks to Mr. Salmon, the secretary, and to Mr. M'Crae, the manager of the company, who he said had both been most indefatigable in helping forward the new works, without asking for any addition to their salaries.

Mr. T. RIDLEY seconded the proposition, and observed with respect to their secretary that he had continued to devote his attention to the interests of the company with uniform assiduity and integrity, and the shareholders had every reason to be thankful to him. With respect to their manager, he thought the remarks made by Mr. Salmon with reference to his ability were fully sustained by the assiduity and energy which he had used to carry out the work that had been entrusted to his care.

The SECRETARY, in responding, reminded the meeting that he was always fond of building, and it gave him great pleasure to visit the works to see what was going on; he found in Mr. M'Crae a faithful colleague, and one who was always in his place.

The MANAGER also thanked the meeting for their satisfactory expressions as to his work, and went on to remark that he was sure no one could possibly have taken greater interest in their new works than Mr. Salmon. With regard to the tank not being water-tight at the present time, as the springs were at the bottom of the tank it was proposed to close them by an automatic valve, so that when the pressure of the tank became greater than the springs, they could be kept down quite close. With regard to the balance-sheet, he had a strong hope that the succeeding half year would be a successful one, because he should be in a position to give a proper supply of gas, and he hoped, if practicable, at a cheaper rate.

A vote of thanks was given to the auditors, Messrs. Clay and Hooper, and the latter acknowledged the same for himself and colleague.

A similar compliment was paid to the directors, to which the chairman and Mr. Portway responded, and the proceedings terminated.

TOWN AND COUNTY OF POOLE GAS AND COKE COMPANY, LIMITED.

The First Ordinary Half-Yearly General Meeting of the Shareholders since the registration of the Company under the Joint-Stock Companies Act, 1862, and the confirmation of their Provisional Order, was held on Monday, the 14th inst., at the Town-Hall. Mr. W. PEARCE occupied the chair, and the following report of the directors was presented:—

In submitting to the shareholders the accompanying statement of the accounts for the eleven months ending the 30th of June last, your directors call attention to the fact that the balance of profit will enable the company to pay a dividend at the maximum rate to which the shareholders are entitled.

Your directors have the satisfaction of reporting that the consumption of gas is now nearly as much as it was when the company supplied gas to the public lamps. Your directors were desirous to resume such supply, and accordingly sent in a tender to the committee of the Town Council, but they regret to state that the committee have determined to recommend its rejection. The tender was as follows:—"The undersigned hereby tender to supply the public lamps of the borough of Poole, in accordance with the specification deposited at the town-clerk's office, for the space of one year from the 1st of September next, at 4s. per 1000 feet, provided the meters be tested and found to register correctly before using, by two persons, one to be appointed by the council and one by the company, and that the company be permitted thenceforward to examine such meters monthly and take the indications."

Shortly after the last meeting of the proprietors in September last, your directors, owing to the diminished cost of coal, were enabled to reduce the price of gas to 5s. per 1000 feet, in accordance with the anticipation expressed by them in the previous April.

Your directors have, in pursuance of the resolution passed by the proprietors in April, 1875, registered the company under the Joint-Stock Companies Act, 1862, and have, notwithstanding the strenuous opposition of the Corporation of Poole (which caused great additional cost), successfully carried through their application for a Provisional Order, which was confirmed by an Act passed in the present session of Parliament, and the company have now, therefore, acquired a perfectly legal *status*, and are invested with all necessary protective rights and powers.

Your directors are enabled to state that the capacity of the works for manufacture, storeage, and purification of gas has been greatly improved by the erection of a large new gasholder, capable of holding 90,000 feet of gas, a new purifying-house with four purifiers ten feet square, instead of two eight feet square, a large governor, and a new meter and governor house, and the number of retorts has been increased and other improvements introduced. The £4800 new capital raised last year has thus been exhausted. But other additions and improvements are considered by your directors to be absolutely necessary, and must at once be carried out. And in particular your directors find it desirable, for the purpose of preventing waste and increasing the quantity of gas, to put up an engine, boiler, and exhauster, and have accordingly taken steps to provide them. Also they have contracted for immediately laying down from the works and along the whole length of the High Street a 10-inch main, and, in other parts in connexion therewith, a 6-inch main, whereby the consumers will obtain a larger and more equal and regular supply.

These further additions to the plant, &c., and the cost attending the application for the Provisional Order (all of which must be paid out of capital, and as regards the Order the expenses would have been comparatively trifling if the company had not been opposed), render it requisite to raise further capital, not exceeding £5000, without delay. This your directors recommend should not be done by issue of further shares (the share capital being already sufficiently large), but by taking up the greater part on mortgage, and the remainder, when required, by issue of debentures. This mode is in accordance with the opinion expressed in Parliament in the present session.

Your directors have only further to state that the existing works have recently been inspected by an engineer of great experience, who expressed a very favourable opinion of their condition, and considered that when the additions and improvements above indicated were completed, the works would be in a most efficient state, and would not require any considerable expenditure for some time to come.

The CHAIRMAN, in moving the adoption of the report, said: Gentlemen, this is the first occasion of our meeting under our new regulations which have superseded the old deed of partnership. The accounts submitted to you are prepared, in accordance with the requirements of the Gas-Works Clauses Act, and afford all necessary information. They show a satisfactory result and the maintenance of your dividend. During the past year considerable additions to, and improvements in, your works have been effected, and others are now in progress. I confidently anticipate that at your next meeting in February, 1877,

I shall be able to announce that the greater part of the alterations and improvements which can be required for some time have been completed, and that the works are in a thoroughly satisfactory condition. The company are now put on an entirely new footing, causing no little labour and trouble in the process. All the routine of management, book-keeping, &c., and in short everything relating to the company, may be described as new. And I can truly say that the directors have, one and all, laboured hard and conscientiously in the company's interests. Whilst introducing improvements in the works, we shall be careful to manage the concerns of the company with such regard to economy as may appear to us consistent with maintaining the works in full efficiency. I am sorry I cannot inform you of the acceptance of the company's tender for lighting the town. Its rejection by the Town Council can scarcely be due to the company asking too much; 4s. per 1000 feet is not unreasonable, for it would afford but a very trifling profit. Then why was it rejected? I assert my belief that it is due to mere party and personal spite on the part of certain members of the Town Council towards some of your directors. I strongly deprecate and greatly regret the introduction of such motives into the proceedings of a public body. I had hoped that all animosity would have ceased with the termination of the proceedings in Parliament. The battle having been fought with a decisive result, all further hostility (unnecessary and unreasonable as it is) would, as a matter of course, I thought have been dropped. The continuance of this antagonistic feeling (evidenced in a variety of ways) is, in members of a corporation, both undignified and disgraceful, and I think there can hardly be one person here present who does not regard the attitude of the Town Council towards this company with feelings of regret, disgust, and annoyance. The radical members of the council would certainly not have made themselves or the town appear more ridiculous than they have done, but as their principle is to be penny wise and pound foolish, I am surprised it did not occur to one of their party to propose that a candle double the ordinary size should be used in the public lamps. There would then have been about the same difference in the illuminating power as there is between the paraffin and gas. I have requested our manager to test the illuminating power of the gas and paraffin light, and his report is as follows:—

Saturday, Aug. 12; 9.30 p.m.—Tested the illuminating power of gas and petroleum. Result—consumption of 5 cubic feet per hour, equal to 15 standard candles; the illuminating power of petroleum, as now supplied to the public lamps, equal to 6 standard candles.

You will therefore find, by calculation, that the ratepayers will be charged about £200 a year more for paraffin than for gas. The loss also to the town in opposing the Provisional Order is estimated at about £700 in law expenses, besides the loss to the company, which must, indirectly, be paid by the consumers of gas. The merits of the case have been before three recognized tribunals—the Board of Trade, the Local Government Board, and the House of Lords—and all have decided in favour of the company. The council had not a ghost of a chance of success from the very commencement, and have created a serious loss to the borough by their very unwise proceedings. I have great pleasure in stating that there has been a great increase in the demand for gas by private consumers, about equal in quantity to that formerly used by the public lamps, which is a proof that the inhabitants are not in favour of petroleum for their private use, and I have every confidence that the Poole Gas-Works will flourish, if well managed, notwithstanding the opposition of Rogers and Company.

Mr. TUCKER seconded the motion.

Mr. STYRING, Mayor of Poole, said he was almost sorry that he was present to hear the speech of the chairman, condemning so strongly the corporation for the action they had taken, for he believed a great many of the council had only done what they thought to be their duty towards the town. He was not present when the tender for lighting the town with petroleum was accepted, but he must say he approved of what was then done. From his own experience he could say that the town had been lighted with paraffin better than it was lighted some years ago with gas. He asserted this without any fear of contradiction, and therefore such a fling as the chairman gave to the corporation was uncalled for. He spoke as a shareholder, whose interests were, of course, with those of the company; but he also spoke as a townsman when he said that he thought the corporation had only done their duty. He did not think it would have been right for him to sit there without saying a word; otherwise it would be said that the mayor of the town was present, and by his silence approved of what the chairman had said. He did disapprove of it. He expected to be alone in saying this, but he did not wish it to go abroad that he listened to this statement by the chairman without saying that he upheld the corporation.

Mr. HAMILTON expressed his agreement with the remarks made by the mayor, and said the chairman had made a most unjust attack on the Town Council. They, as far as he could judge, acted most fairly in the matter, and, although a shareholder of the company, when he saw a saving to the ratepayers effected, he thought it right to support the majority of the council.

The CHAIRMAN said he felt that he had not said anything stronger than the occasion required.

The motion was put, and carried unanimously.

On the motion of the CHAIRMAN, seconded by Mr. ADEY, the dividend recommended in the report of the directors was declared.

The meeting was then made special, and a resolution was adopted authorizing the directors to raise, either by bond, debenture, stock, or loan, or partly by one and partly by another of such means, any sum not exceeding £5000.

A further resolution was adopted, authorizing the directors to take steps for converting the 400 shares of £2 each, issued in 1855, and now paid up, into 80 shares of £10 each.

Mr. PENNEY then moved the following resolution:—"That the sum of £10,520, expended on works out of profits applicable to dividend, and authorized by the Provisional Order passed in the present session of Parliament, to be allotted rateably amongst the holders of the A, or existing shares, in the form of B shares, with a dividend limited to 4 per cent., be allotted as hereinafter mentioned; that is to say—that a sum of £9600 out of the said sum of £10,520 be allotted rateably between the holders of the present shares, so as to give each of the holders of the present shares an amount thereof precisely equivalent to his present holding; that the further sum of £920, being the balance of the said sum of £10,520, be allotted to the directors, to be apportioned amongst themselves in such manner as they think fit, in consideration of their having for many years served without remuneration, and in recognition of their services in establishing the company in its present prosperous condition."

Mr. T. S. FURNELL seconded the proposition, which, after some conversation, was put and carried unanimously.

The directors were then authorized to issue certificates for B shares, in accordance with the resolution, to bear interest at 4 per cent. per annum from the 30th of June last.

A vote of thanks was presented to the mayor for granting the use of the town-hall for the meeting.

The MAYOR, in acknowledging the vote of thanks, said he was sure that if the chairman had been in his position he would not have sat still after listening to what had been said of the corporation. The mayor then proposed a vote of thanks to the chairman.

Mr. TUCKER seconded the proposition, and proposed a vote of thanks to the directors for their services, particularly during the past year. He hoped that before long they would again see the streets lighted with gas, as he first saw them 42 years ago.

The CHAIRMAN, in replying, said he had always endeavoured to do his duty at the gas-works, and to say as little as possible as to what was going on outside. The action taken by the corporation had been a great trial to the town, and he thought a great deal more than he had said might be said on the subject. As far as his services were concerned, he had pleasure in making a present of them to the public.

The meeting then terminated.

PETERBOROUGH GAS COMPANY.

The Ordinary Half-Yearly Meeting of Shareholders was held on the 15th inst.—Mr. W. HARRIS, chairman of the directors, presiding.

The following report of the directors was read:—

In submitting the balance-sheet and statement of accounts for the half year ending the 30th of June, 1876, the directors are glad to be able to present to the shareholders results so highly satisfactory as those shown therein.

During the half-yearly period the revenue has been greatly augmented, whilst the working expenses have scarcely, if at all, increased, and after providing for every liability the revenue account shows a balance of £2308 10s. 4d.

The balance of the profit and loss account (including the amount carried over last half year) amounts to £2874 16s. 10d., out of which, after providing for the payment of the preferential dividend on the £5 per cent. new preference "A" shares, your directors recommend the payment of the maximum dividend for the half year on the other classes of share capital of the company free from income-tax, payable on and after the 25th day of August inst., which will absorb £1911 3s. 3d., leaving a balance of £963 13s. 7d. Your directors, therefore, further recommend that £300 be placed to the credit of the reserve-fund, £150 to the credit of the contingent-fund, that a back dividend at the rate of £1 per cent. per annum be declared payable for the year ending the 30th of September, 1869, making, with the dividend then paid, a dividend of £7 per cent. per annum for that year, and that the balance then remaining be carried forward to the next half year's account.

In comparing the present statement of accounts with that for the corresponding period of 1875, it will be observed that there is a large increase in local rates. This item has advanced from £139 4s. 5d., being the amount paid for the year ending the 31st of March, 1871, to the sum of £470 17s. 11d., the amount paid for the year ending the 30th of June, 1876, thus showing an increase of £331 13s. 6d. as compared with the annual sum paid five years ago. This is due to the excessive rateable value at which the company's property has been assessed by the local rating authority. Deducting poor's rate (£121), the Corporation and Cemetery Commissioners together have during the year received out of the profits of the company the sum of £350 for borough purposes. The total amount of local rates for the year ending the 30th of June, 1876, is equal to a charge of 3d. upon every 1000 cubic feet of gas sold by the company, and the increase of this year over last is alone equal to 1d. per 1000 cubic feet.

The extension of mains on the Thorpe Road and in the new streets on the Springhill Estate, referred to in the last report, has been completed. Lamps have been erected and lighted in the former locality, but owing to the Town Council having rejected the conditions previously agreed on with the company for lighting the borough, the erection of the lamps on the Springhill Estate is in abeyance.

As intimated in the last report, the various plots of land adjoining the works on three sides, and including a strip of land to double the width of the approach road (all as scheduled in the company's Act of 1874) have been purchased by arbitration, and form a valuable addition to the company's property for present and future purposes. Some outlay will in due course be necessary for the erection of boundary walls and other fences for the purpose of enclosing the land.

With a view to increase the return derivable from the ammoniacal liquor, and for the purpose of abstracting the whole of the ammonia from the gas, and bringing it to profitable account, your directors have resolved to erect a new patent scrubber and appliances for that purpose. The cost of the same, including foundations, will be about £500.

Your directors cannot close this report without stating that the excellent results as shown by the statement of accounts and balance-sheet have been mainly produced by the foresight and sagacity of the manager, combined with his strict attention to the minutest details of his work. They also express their satisfaction with the manner in which the secretary and other officers of the company fulfil their duties.

Three of your directors—viz., Messrs. Thomas Dickinson, Augustus Palmer, and Daniel Henry Redhead—retire from office by rotation, and are all eligible for re-election.

The retiring auditor is Mr. J. F. Arnold, who is also eligible for re-election.

Capital Account.

Dr.		*Cr.*	
Outlay on works, mains, and meters to Dec. 31, 1875	£53,611 19 5	Share capital, viz.—	
Land, including cost of arbitration and conveyance	1,838 10 0	2000 original ordinary £10 shares	£20,000 0 0
Extension of works	9 11 6	1000 new ditto £10 shares	10,000 0 0
Extension of mains	574 19 7	1065 new A do. £10 shares. £10,650 0 0	
Additional meters	44 9 9	Less calls unpaid 644 0 0	
			10,006 0 0
		930 new A preference £10 shares	9,300 0 0
			£49,306 0 0
		Mortgage	£6,446 10 0
			£55,952 10 0
		Balance	127 0 3
	£56,079 10 3		£56,079 10 3

Revenue Account.

Dr.		*Cr.*	
Stock on hand, Dec. 31, 1875	£157 16 10	Gas sold	£4,576 9 1
Gas manufacture, viz.—		Meter-rents	72 1 3
Coal and cartage	1,935 14 6	Coke	888 12 3
Lime	50 15 6	Tar	336 16 2
Cartage of tar, liquor, &c.	27 10 9	Ammoniacal liquor and sundries	66 9 8
Wages	455 0 4	Fittings and workmanship	53 3 10
Sundry material and workmanship	70 5 1	Bad debts recovered	0 19 6
Repairs & maintenance, viz.—		Stock on hand, viz.—	
Repairs and renewals of mains and service-pipes	59 12 11	Tar	75 0 0
Repairs of retorts	125 9 11	Ammoniacal liquor	20 0 0
Repairs, general	69 3 7	Fittings	24 16 10
Repair & inspection of meters	41 0 4		
Charges, &c., viz.—			
Rates and taxes	257 14 5		
Salaries	238 10 0		
Stationery and printing	17 3 7		
Income-tax	23 8 2		
Incidental expenses	23 9 8		
Gas-fittings	34 9 7		
Audit of accounts to Dec., 1875	7 7 0		
Interest, viz.—			
On mortgage	143 12 9		
Bankers	52 15 7		
Bad debts	13 1 0		
Overcharges and allowances	1 16 9		
Balance	2,308 10 4		
	£6,114 8 7		£6,114 8 7

The CHAIRMAN, in moving the adoption of the report and accounts, stated that he believed the report would commend itself to the attention and appreciation of the shareholders. Every half year the balance-sheet had been an improvement upon the preceding half year, and the present balance-sheet was the best that the directors had ever put forward.

Resolutions authorizing the payment of the dividends and back dividend, set forth in the report, were unanimously passed, the retiring directors and auditor were re-elected, and the meeting terminated with a vote of thanks to the chairman.

NORTH BRITISH ASSOCIATION OF GAS MANAGERS.

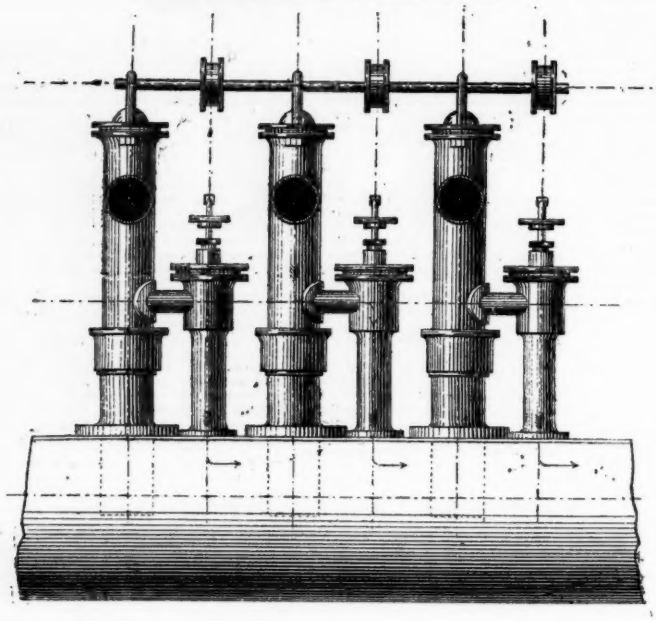
(*Continued from page* 244.)

Mr. D. M. NELSON (Glasgow) introduced the subject of

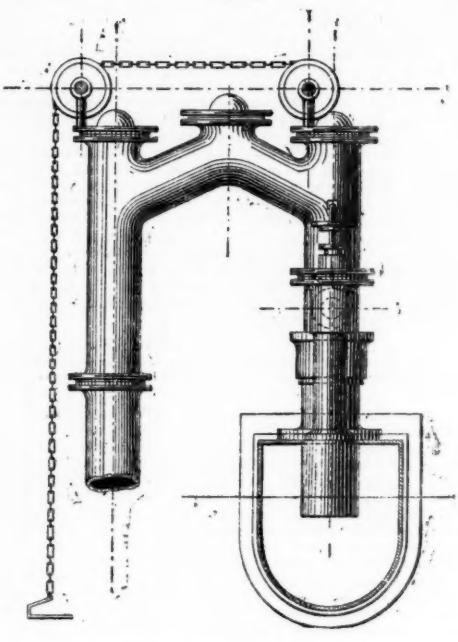
COPP'S PATENT ANTI-DIP.

He said, So much time has been occupied already by the discussion of a subject somewhat similar, that I shall not take up the time of this meeting with any formal paper, but briefly describe the apparatus now exhibited on this table; neither literary effort nor highly-finished diagrams being required to commend it to your attention. The rough chalk sketch upon this black board will fully illustrate the construction and operation of "Copp's Patent Anti-Dip."

FRONT VIEW OF A BENCH OF THREE RETORTS.



END.



Scale—$\frac{3}{4}$ *inch* = 1 *foot.*

"Thus simply explained, no eulogy is required to recommend its adoption; the best evidence in its favour being, that it is eminently simple, practical, and not liable to get out of order, and that some hundreds of them have been in use during the past nine months in various works throughout the country, with the very best results.

These results testify that by the application of this simple and inexpensive apparatus the gas obtained is of superior quality, and greatly increased in quantity, ranging from 500 to 1000 cubic feet per ton of coal carbonized.

I need not say anything further beyond thanking you, Mr. President, for giving me the opportunity of bringing this apparatus under the notice of our Association.

Some questions were put to Mr. Nelson by various members, and were answered by him, also by gentlemen present, who, having used the appliance, could speak favourably of its merits.

On the motion of Mr. PEEBLES, a vote of thanks was accorded to Mr. Nelson.

Mr. ALEXANDER (Corstorphine) read the following paper on

SUNDAY LABOUR IN GAS-WORKS.

For many years past, it has been a "much vexed question," what amount of labour may, under peculiar circumstances, and in certain departments of human life and action, be lawfully, or the reverse, engaged in on Sundays. The pulpit and the press have alike called attention to the subject. Sermons have been preached, lectures delivered, volumes and pamphlets have been written, leading articles and prize essays have issued from the press on this important question, which, to all appearance, still remains as far from settled as ever; and it is to be feared that, notwithstanding all that has been done, encroachments on the day of rest have considerably increased during the last thirty years.

So far as I am aware, this subject has only once been before this Association, whose object in the past has been to discuss and elucidate natural rather than moral science; but as our committee, in their circular of last autumn, invited attention to the above topic, it may not be without profit that we turn aside from the consideration of subjects allied to natural, and, for a season, take up one relating more to moral philosophy. That any subject, bearing on the human conscience, or having for its object either moral or social improvement, should be taken up and discussed by a body of men too generally, but, without ground, looked upon with suspicion, by some blamed for over-reaching, charged by others with making gas from the merest rubbish, and crowning the climax of iniquity by mixing the said gas with atmospheric air—that anything good should emanate from such men must strike the world outside with surprise, and in our case lead to the renewal of the inquiry made centuries ago, in reference to Israel's first monarch, "Is Saul also among the prophets?"

A circular on Sabbath desecration was last year issued by a religious body, and appointed by them to be read on the Sabbath-day, Nov. 4, in all the churches within their bounds. In this document we hold a place, and reference here will only be made to it for the purpose of showing the class of transgressors to which we belong. I shall only enumerate the forms of desecration complained of; such as travelling by railways and steamboats, the employment of cabs and other vehicles for pleasure, dairys, shops kept open, work in newspaper offices, "besides the labour carried on in breweries and gas-works." In looking at the above list, is it not rather significant that all the desecration complained of has reference to the middle or working classes? No mention is made of the equipages rolling along our streets, conveying their aristocratic occupants—it may be only a few hundred yards—to church; and who not only thus desecrate the day themselves, but, that their indolence or ambition may be ministered unto, deprive the brute creation of their heaven-granted boon—a day of rest. Why tolerate this and complain of the Sunday-manufactured gas used for lighting up these churches? But do not many of our clergy feel elated by having such people as members; and do they not feel that the greater the number of such equipages at their church doors, the greater is the respectability and influence of the congregation, making it the envy of others less favoured.

But to the subject of Sunday labour in gas-works; here the question arises: Has the introduction of gas caused an increase of labour on the day of rest? It will not be difficult to show that it has not.

Take, for the sake of argument, a community of 150 gas consumers; allow to each householder three lights, or a total of 450 lights. To supply these with gas on a Sunday night, four hours work will be required, assuming that the gasholder is quite full in the morning; two hours of this work is required in charging the retorts necessary to maintain the supply needed, and this for 20 Sundays in the year; the other two hours being required all the year round for the indispensable attention to the furnaces to keep up the heat. To light up the same community, 450 lamps will be required; to trim these properly three minutes will be necessary for each, and the aggregate amount of time spent in such labour amounts to $22\frac{1}{2}$ hours, thus proving that, while lighting by gas has deprived one person of four hours rest, it has saved the general community about 22 hours work.

Of all the forms of Sunday labour which may be classed under the term "works of necessity," none have a better claim to rank foremost than gas-works; while cities, towns and villages continue to be lighted by gas produced from coal, oil, or any other material requiring the action of high heat for its distillation, a certain amount of work must be done on Sundays. Suppose a total cessation of work, from twelve o'clock on Saturday to the same hour on Sunday night, the furnaces filled up and damped with the utmost care, would any of us undertake a sufficient supply of gas for Monday evening—nay, would it not be the day following, or even longer, before the lost heat could be regained, and the usual daily supply of gas could be produced? But this is not all; there would be such a ruinous deterioration of retorts as almost to render gas manufacture impracticable. Taking this view of the case, it is assumed that the storeage is quite adequate to the requirements of Sunday evening lighting. On the other hand, suppose suspended labour with limited holder room; the result would be, when the stock of gas became exhausted, great inconvenience in the homes of rich and poor, and the darkness in our unlighted streets would prove a protection to the perpetration of crime, and afford a shelter for the commission of many a foul deed.

I hope I shall not be understood as wishing to defend Sunday labour; on the contrary, I yield to none in the desire to see it done away with as much as possible in all gas-works, as also to be quit of it myself; that this can be done altogether is impossible, but that it may be considerably abridged, no one, I think, will deny.

Before considering how Sunday labour in gas-works can be curtailed, let us briefly look at the evils resulting from its practice; and it would be out of place here to discuss the subject in a religious point of view, or seek to enforce the perpetual obligation of the Sabbath; leaving such topics to those whose province it is to deal with them, let us look at Sunday labour as a physical, moral, and social evil.

That man's physical constitution requires periodical and regular seasons of rest seems now admitted on all hands; the hours nightly spent in sleep are not enough to maintain his bodily frame against the wear and tear of daily toil, but one day in seven must be set apart for an entire cessation from bodily labour, that corporeal and mental vigour may be kept up. One of our Continental neighbours at one time made the experiment of abolishing the day of rest, and the consequences on the population were soon apparent—weakness, disease, and death, being the result. A further trial was made of a tenth portion of time devoted to rest, but this, too, failed; proving clearly that man's bodily organization requires the rest of every seventh day. The working man who habitually or frequently violates this law of his nature soon becomes thin and emaciated, and hastens on old age apace.

But Sunday labour not only injures man's bodily frame, but tends to produce a deadening and demoralizing effect on his higher nature. When a man first commences to work on the day of rest, he does so with somewhat of reluctance; something within suggests that it is not quite right; the very sound emitted by the tools he handles, little noticed on other days, strikes strangely on his ear; but let this be often repeated, and these feelings get blunted or die away, and he works on this as on any other day. The eight-hour shifts, adopted by

many of our large gas-works, have, it is said, worked beneficially, and been productive of good; but under this system the working man has only two Sundays rest out of three. If the loss of this day caused the man to be more attentive to, or engage more eagerly in, those duties usual on the day of rest, the evil would not be so great, but experience shows the reverse of this to be the case; a languid indolence is engendered, and but seldom is he seen spending the two intervening Sabbaths as he ought.

Moreover, prolonged exertion causes a void in the human system, which food does not even fill up; and a craving for stimulants is the evil result, to repair nature's overtaxed energies. Although not usual in gas-works, in some other large public works where a necessity is urged for Sunday work, the cupidity and selfishness of man's nature are appealed to, and he barters his birthright for a double day's pay. But the evil is not confined to the man who engages in Sunday work, for the example of any one has some influence on others; and if nowhere else, certainly it affects his own family—for we are not to suppose that only single men are employed in gas-works. How ineffectual will be the efforts to impress on the minds of his children a right observance of this day? Almost unheeded, will be any precept on this subject, coming from one, who to them is a living witness, that the day may occasionally be disregarded or violated by labour with impunity, and it is hard to say what may be the injury thus done to his own children, and through them transmitted to others. But the bad effects of Sunday labour are not confined to the working man, they extend to the manager, whose position in this respect is very different from other business men; these may shut their places of business on Saturday at any hour which may suit them, and need not trouble themselves much about business until resumed on Monday. But the gas manager has ever the anxiety and responsibility of his work on his mind; and if resident at the works, as is usually the case, the sights and sounds of daily work are ever present to him on the Sunday. Can he enjoy on that day the same quiet or freedom from care as any ordinary business man? Nay, on the contrary, he is liable to be summoned at any moment to give his personal superintendence or partial assistance in any emergency which may occur through a derangement in the apparatus; besides, there are not a few who have to lay to their hand and take a share in the arduous labour of the gas-work.

Having looked at some of the evils, let us now consider the remedy for Sunday labour. It has already been shown that attention to furnaces is indispensable, but could the work be reduced to that point, much would be gained; and this can only be done by increased holder accommodation. In this department, were such an extension made as to permit, say, of one-tenth more gas being stored than is required to meet the demands of each day, a sufficient stock would be accumulated by the end of the week to meet the requirements of Sunday without any actual manufacture on that day; in most cases the consumption on that evening being very much less than on any other evening in the week. In works where from 20 to 50 men, or even more, may be employed on the shift, were the number reduced to 2 or 5, whose work would only consist in trimming the fires and maintaining the heat in the ovens, taking this in regular turns they would only be so engaged one Sunday out of ten, or five Sundays in the year. It would be presumption in me, occupying the narrowest sphere of any in the Association, to lay down rules or go further into details.

This must be left to those of extended experience and practice; let us have but more storeage, and each one will soon be able to accommodate himself to the altered circumstances of the case.

Some may think that an increase of retort power would be necessary; but in very many instances such will not be required, for how common is it that, on account of limited storeage, the charging of the full number of retorts in use has to be deferred until the consumption of the evening has commenced, to allow space for the gas as it is sent off by the retorts. The change would be attended with considerable expense, varying according to the extent of enlargement required; but this may be got over by a trifling addition to the price of gas; and surely our friends who are so anxious for Sabbath observance cannot grudge this, or denounce such a rise as an "imposition;" and instead of complaing that the "gas account is a heavy item in their household expenditure," they will gladly go in with a rise in the price, when such is to be devoted to the good work they have so much at heart.

Might the present time not be a fit opportunity for attempting some improvement, when a favourable change in the coal trade has led so many to a reduction in their price—for almost daily our newspapers contain an announcement of a reduction in the price of gas in different parts of the country? Might it not be well, while giving gas consumers the larger share of the practicable reduction, to retain a small portion for the enlargement above alluded to, that both managers and men may participate in the benefit; the former in having less anxiety, and the latter in having less labour on Sunday?

Should we not, as an Association, go into this subject in all its bearings, and by circulars and other legitimate means of agitation, bring it under the notice of directors and shareholders in gas companies, and, if need be, the general public, claiming their support in assisting us to abolish, as far as practicable, Sunday labour in gas-works? If we fail, we will have the consolation of having done our duty; and if successful, the satisfaction will be ours of having, in part, emancipated some of our fellow-men from the demoralizing influence of work performed on the Sunday.

Mr. CLAZY: I am sure we are obliged to Mr. Alexander for bringing forward this paper, and I am certain that, on consideration, every member present will use his utmost endeavour to reduce Sunday labour as much as possible.

Mr. HISLOP: I think it is a matter for regret that Scotch gas managers are lagging behind in this matter; and I am, therefore, glad that this subject has been brought before the Association. In Paisley, I make it a point to stop work as long as possible on Sundays. It has been urged that small storeage was much against managers carrying out this scheme, but many who have the cause at heart have found this objection of no value. Where there is a will there is a way, and I hope that members present who are managers of Scotch gas-works will see it to be their duty to reduce Sunday labour as much as possible. The English look at the question from a physical point of view, but I cannot myself separate the moral from the physical. I think the constitution of man requires, and the laws of God demand, a day of rest. It is urged that great loss is sustained by the diminution of the heat in the retorts; but I think it will be found that by arranging the dampers to prevent an undue volume of air getting into the ovens the loss under this head will be quite inconsiderable. I therefore warmly commend to the Association the consideration of this paper.

Mr. SMITH (Aberdeen): I have given the subject some consideration. I do not hold that stopping for a short time on Sunday is any settlement of the question at all. If you keep a man working twelve hours a day during the week, and stop for a few hours on Sunday, what can he be useful for? He must lie about the house. About three years ago I communicated with Mr. Reid, and I asked him what he thought of adopting the eight-hours system. He was working it, and he recommended its adoption. I can assure you that by that system you get a better class of men, and you get the work better done. I must say that I do not see any other way of working gas-works but by the three-shift system. Stopping for a few hours is no settlement of the question.

Mr. WATSON (Stirling): I would like to endorse Mr. Hislop's statement. In Stirling we arrange matters thus: On Saturday the day shift comes out at six and goes away at twelve at night, and the night shift comes in at twelve and goes away at six o'clock in the morning, and from six o'clock on Sunday evening we have always time to have the holders filled by Monday night. I do not think there is any difficulty in doing this.

Mr. WALKER (Milwaukee, U.S.A.): I have returned to Scotland, after an absence of 30 years. I have watched the progress of the Sunday labour question here with a great deal of interest. Two years ago I read a paper on this subject to an American Association; and I may now state that in the year 1860 I commenced the practice of abolishing Sunday labour in Harcourt, Connecticut, and the result has been of immense value to the men. I have been able to get a better class of men, and I have no difficulty in getting my holders filled up on Saturday night. The men now value the cessation from labour on Sunday far more than the pay. On the Sunday we have 14 benches going, and for these we leave one man and one foreman every Sabbath, all the others being free; and we have not the slightest difficulty in handling our fires and keeping up the heats. The results per man and per hour at my works will compare favourably with others where work is done on Sunday.

The PRESIDENT: Do you stop at six o'clock in the morning?

Mr. WALKER: We govern that by the quantity of gas. If the night foreman finds it necessary to put in a charge before the men go at six o'clock, they charge so as not to give the day men this work. The whole of the men, with the exception I have stated, stop twelve clear hours, or more if it can be done. I have in one work put in the last charge at twelve o'clock on Saturday night, and did not again charge till twelve o'clock on Sunday night. I had no difficulty with the heats.

The PRESIDENT: We are indebted to Mr. Walker, and I think it is important that we should try and get rid of Sunday labour. I had no idea that the folks in the south were doing so well. In Greenock we stop twelve hours on Sunday, but only with one half of the men, and we substitute six hours charges for three hours charges on that day; but I could not introduce this change until I promised to pay the men who were off their full wages. We get along well, our heats are none the worse, and we make nearly as much gas on that as on any other day. The men, however, understand if they neglect the work the arrangement comes to an end.

Mr. REID: This is a question which has occupied my mind for many years. I see great difficulty in abolishing Sunday labour for the twenty-four hours. I have, however, succeeded in diminishing the amount of Sunday labour by the adoption, three or four years ago, of a system of eight-hour shifts. By this arrangement we give every man engaged with the retorts the whole twenty-four hours one Sunday, sixteen hours the next, and eight hours on the third Sunday. In thus diminishing Sunday labour, we get a far better class of workmen, who faithfully perform their duty.

Mr. WALKER: We pay our men the same whether they work on Sundays or not, and I find now that the men value the Sunday far more than money.

The PRESIDENT: The great difficulty is to try and get the twenty-four hours clear.

On the motion of Mr. HISLOP, a hearty vote of thanks was accorded to Mr. Alexander.

Mr. YOUNG (Clippens) read the following paper on

THE UTILIZATION OF THE GASES RESULTING FROM THE DESTRUCTIVE DISTILLATION OF SHALE IN THE MANUFACTURE OF PARAFFIN OIL.

When coals and shales are subjected to destructive distillation at the lowest temperature, which will decompose them, and liberate their volatile constituents (as is the case in the manufacture of crude paraffin oil), there is always produced, along with the large quantity of condensible liquid products, a considerable volume of permanent gases. These gases very much resemble such as you are every day making for the supply of your various communities; and I have no doubt that many of you, when travelling through the oil-manufacturing districts, and seeing the large volume of gases which the oil-manufacturer allows to escape into the air, have experienced the desire to have your holders attached to his waste-gas pipe.

There is not the least doubt that the best mode of utilizing these gases for illuminating purposes is to supply them direct to the consumer, where this can be conveniently done. Young's Paraffin Light Company have for a considerable time supplied from their works the town of Bathgate and the village of West Calder with the gases resulting from the distillation of the shale for oil. But, almost as a rule, oil-works are, from the nature of the material used, necessarily located where the shale or coal is raised, and at considerable distances from towns of sufficient size to take anything like the quantity produced; and further, as the make of oil, and consequently, the make of gas, is the same all the year round, it is evident that there would be a large surplus of gases during the summer months, and that, if those gases are to be used for the purposes of illuminating, some special means must be employed for their application. It is more especially to those means that I wish to draw your attention to-day.

As I have already said, the crude gases resulting from the destructive distillation of shale and coal in the manufacture of paraffin oil are, in their constitution, very similar to those you are making every day for the supply of your consumers—consisting, as you are aware, of non (or feebly) luminous combustible gases; illuminating gases, and the vapours of hydrocarbon fluids diffused through those gases; and lastly, the impurities—sulphuretted hydrogen (and perhaps other sulphuretted compounds), carbonic acid, and ammonia.

The only essential difference between ordinary illuminating coal gases and the gases from shale oil-works is, that in these latter there is scarcely a trace of bisulphide of carbon or cyanogen compound, and that they contain a comparatively large volume of the hydrocarbon vapours diffused through them, and to which they are principally indebted for their illuminating power, those hydrocarbons belonging principally to the marsh gas group of compounds or paraffins; whereas those in ordinary coal gas belong principally to the olefiant gas and benzole groups.

Seeing that, in so far as illumination is concerned, the non-luminous gases are comparatively valueless; and further, seeing that the shale gases derive their illuminating power principally from the vapours of very volatile hydrocarbons diffused through them, it will be evident to you that, were it possible by any convenient means to convert those vapours into a liquid portable form, many of the difficulties of applying the waste shale oil gases for the purposes of illuminating would be overcome.

There are various means of depriving a gaseous body of the vapours diffused through it—thus, if we desire to deprive a gas of watery vapours, we pass it over or through some substance, such as sulphuric acid, or chloride of calcium, which, having a strong affinity for water, absorbs and removes the watery vapours; or, if we subject the gases to intense cold, the vapour tension is so far reduced that the waste vapour is in a great measure deposited; or by compressing gases, and thereby reducing their volume, their capacity for holding vapour in diffusion is lessened; thus, by doubling the pressure on gases, their volume is reduced by one-half, and their capacity for holding vapour in diffusion halved also.

Some years ago, my late brother-in-law, Mr. G. F. Cusiter, was appointed by this Association one of a committee to investigate as to the utility of glycerine as a substitute for water in the wet meter. During a visit which I paid him at the time of the trials, he mentioned the subject; stating that the results from the use of glycerine were not all satisfactory, and that he had been fishing about for other substitutes. I suggested the use of intermediate paraffin oil as a likely liquid, seeing that it would neither freeze nor evaporate, and that as it was not mixable with water, any water condensed in the fittings and finding its way into the meter could be easily separated and drawn off; it would also act as a good lubricant, and prevent the destruction of the metal of which the

meter was composed; and lastly, as it was a comparative drug in the market, it could be got cheap.

I supplied him with samples of this oil, with which he filled the meter he had been using for the experiments with glycerine, when we were both much surprised to find that on turning on the gas it had lost the greater part of its illuminating power, in consequence of the oil having an absorbent power for the illuminating constituents in the gas.

Being then personally engaged in the manufacture of crude paraffin oil, the discovery naturally suggested the application of this oil for the absorption and recovery of the very volatile hydrocarbons diffused through the waste shale gases. After a long series of experiments, extending over a number of years, I have succeeded in perfecting a process whereby, by employing this oil either without or in conjunction with pressure and cold, between 60 and 80 per cent. of the total illuminating power of the gases resulting from the distillation of shale for oil is recovered in the form of this volatile liquid.

To describe the process would extend this paper to an inordinate length. Suffice it to say, that in its simplest form it very much resembles that described before the British Association at their meeting in London in 1870, by Mr. Livesey, as Mr. Hill's process for employing ammoniacal liquor to remove sulphuretted hydrogen from coal gas, the absorbent oil taking the place of the ammoniacal liquor, and the sulphuretted hydrogen representing the hydrocarbon vapours. To those desiring more information on the subject, I beg to refer them to the specification of patent dated 7th September, 1875 (No. 3137).

Before proceeding to refer to the various ways in which this fluid may be applied for illuminating purposes, I wish to make a few remarks upon the wonderful affinity those hydrocarbons have for the sulphuretted compounds present in the crude gases. The oil employed to absorb the vapour of this sample of fluid from the gas was free from sulphur compound, and the vapours were distilled from the oil in an atmosphere of steam upwards of ten times their volume, yet they have held on by the sulphur compounds; for, you see that when I bring these into contact with a solution of a lead salt in this test-tube, the black sulphide of that metal is at once formed, and in such abundance that the whole becomes a pasty mass. As to what is the nature of the sulphur compounds, I am not in a position to say much, having made few experiments likely to throw light on their constitution; and any experiments which I have made in that direction have been of a very practical character.

In the treatment and preparation of the hydrocarbon fluids for the market, it, of course, was essential that they be freed from all sulphur compounds. As a ready means of accomplishing this object, the passing of the fluid through a bed of moist peroxide of iron suggested itself, but in how far it was successful, you will gather from the following experiment:—

I have here a sample of the crude hydrocarbon fluid, which I will divide into two portions: the one I will pass through this filter filled with peroxide of iron, and the other I will pass through this other filter, containing moist hydrate of lime. Now, in my opinion, if the sulphuretted compound consisted of the simple gas-sulphuretted hydrogen, dissolved in the hydrocarbon fluid, the hydrated oxide of iron should absorb and remove every trace of it; but, to show that such is not the case, I have only to add a little of this hydro-carbon standing over the oxide to the solution of a salt of lead contained in this test-tube, when you see that a sulphide of the metal is at once formed, although not in the same quantity as before. Such is not the case with the sample treated with the caustic lime; for, as you see, the lead salt is not at all affected, showing that the oxide has not the power of removing certain sulphur compounds which are removed or decomposed by lime and salts of lead. This sulphur compound, whatever may be its constitution, must be very volatile, for it nearly all passes over with the hydrocarbon vapours during the earlier stages of the distillation.

As it is possible that similar sulphur compounds are present in ordinary coal gas produced during the earlier stages of the carbonization, when the temperature is comparatively low, it is quite possible that lead paper may be blackened and yet it may not be due to sulphuretted hydrogen. This experiment further points to the superiority of lime as a purifying agent.

As I have already stated, the hydrocarbon fluid represents from 60 to 80 per cent. of the illuminating power of the waste shale gases from which it was absorbed and isolated by means of the heavy oils. It consists of a large number of distinct hydrocarbons, some of which, when separated from the rest, are permanently gaseous at ordinary temperatures; for, on subjecting the fluids to distillation, there is a portion which escapes condensation, even although salt and pounded ice be employed as the condensing medium. Those very volatile fluids are held in solution by the denser hydrocarbons present, a small portion of which have a boiling point as high as 350° Fahr.

I have here a sample of the more volatile portions of this distillate in this strong flask, which has been condensed at low temperatures. You observe that on opening the stop-cock in the mouth of the flask, and thereby relieving the pressure, the contained fluid commences to boil; the temperature of my hand being sufficient to liberate the most volatile portions in the form of gas or vapour. I will now allow a little of the fluid to escape into this test-tube, to which I have previously added a portion of this fluid, which belongs to the denser portion of the distillate, boiling at 140° Fahr. You observe that the boiling immediately ceases, for the pressure of the denser hydrocarbon reduces the vapour tension of the more volatile, and the whole is thus kept in a fluid state under ordinary atmospheric pressure.

In a similar way, when shale gases are subject to considerable pressure, the tension of the gases themselves is not nearly so great as that of a similar volume of a purely gaseous body; because, as the pressure increases, and the tension of the hydrocarbon vapours is overcome, and they are condensed into the liquid form, they, at the same time, absorb or dissolve a portion of the permanent gases, more especially those gases giving, when burned, a considerable amount of light. And I am of opinion that the shale gases might, from their comparatively easy compressibility, be advantageously transported for direct consumption for illuminating purposes; for, by having railway waggons furnished with strong malleable iron reservoirs, 15,000 to 20,000 cubic feet of gas could be easily stored and thus conveyed to where it was required, and then emptied into the gasholder, drawing the gases from the reservoir at the lowest point, and passing through a suitable vessel, that the condensed hydrocarbons might be revolatilized into the transferring gases.

There are various means of applying those hydrocarbons condensed from shale gases for illuminating purposes: one of the simplest being to reconvert them into illuminating gases by diffusing their vapours through some permanently gaseous body, a combustible gas being preferred, such as water gas, hydrogen and carbonic oxide, or poor coal gas; but where that cannot be obtained, even atmospheric air may be employed.

I have here an ordinary bromine test-tube, the bulb of which is filled with air and the stem with water. I will now introduce a little of the hydrocarbon, just as you would a little bromine when testing for the condensable hydrocarbons in gas; by inverting the tube, I bring the hydrocarbon and the air into intimate contact, and on again bringing the tube into its original position, and removing my finger, you see how the hydrocarbon has volatilized into the air and increased its volume, and the whole of the water is driven out of the tube.

I will now take a little of this intermediate oil, and bring it into contact with the charged air. You see how quickly the vapours are re-absorbed by the oil, the test-tube being at once refilled, showing that the vapours have been absorbed and removed.

If I blow air through this Woolf's bottle, containing a small quantity of this hydrocarbon, you see that it becomes so charged with vapour that it is combustible, or, in other words, it is formed into pneumatic gas. I dare say most of you have seen machines for the manufacture of this gas, and therefore I shall not at present refer further to the subject.

To use the hydrocarbon fluid in this manner, however, is very wasteful, as a considerable portion of it is consumed in heating up the incombustible nitrogen in the air, and in forming with the oxygen a combustible gas to intensely heat the particles of carbon or denser hydrocarbons resulting from the decomposition of the remaining portion.

A much more economical way of utilizing the vapours for the purpose of giving light, is to combine them with water gas, hydrogen and carbonic oxide, or other non (or feebly) luminous gas, in the manner described by Mr. R. P. Spice, at the meeting of the British Association of Gas-Managers held last year, and to which I beg to refer you.

However, perhaps the best mode of applying this fluid, in so far as the members present are concerned, is for the purpose of enriching ordinary coal gas in place of cannel coal. I have here a Woolf's bottle, through which I will pass the gas supplied to this room. You see what a remarkably rich flame it produces. A gallon of this fluid added, in the form of diffused vapour to 1000 cubic feet of gas, increases its illuminating power from 10 to 12 candles.

Where none of the above modes of employing the fluid are available, it may be consumed in the ordinary vapour lamp which was used long ago for consuming a mixture of alcholol and benzole. I have here a lamp of that description, and you see how excellently the fluid burns in it.

I should have liked to have gone more practically into the application of this hydrocarbon fluid for the purposes of illumination, more especially that of enriching poor coal gases, showing the best means of applying them and the relative values, &c. Mr. M'Gilchrist kindly arranged for a series of experiments being made in his works at Dumbarton; but as I have already stated, the want of time has prevented these trials being made. However, I hope that, with the permission of the Association, at some future meeting, either Mr. M'Gilchrist or I shall be able to give you the practical results of those trials, and, in the meantime, I trust that even what I have been able to say has interested you a little.

On the motion of the PRESIDENT, a vote of thanks was accorded to Mr. Young for his interesting remarks.

A lecture upon "The Chemistry of the Combustion of Coal Gas" was then delivered by Dr. STEVENSON MACADAM; and at its conclusion, the thanks of the Association were tendered to Dr. Macadam.

PLACE OF MEETING IN 1877.

The next annual meeting of the Association was fixed to take place in Stirling, on the second Friday of July, 1877.

A vote of thanks to the President brought the proceedings to a close.

Later in the afternoon, the members of the Association and friends dined in the Café Royal Hotel; Mr. Stewart, President, in the chair, with the president-elect as *croupier*, and a very pleasant evening was spent.

IRON AND COAL TRADES OF SHEFFIELD, SOUTH YORKSHIRE, AND NORTH DERBYSHIRE.

(FROM OUR OWN CORRESPONDENT.)

The local trades remain quiet in all departments, save that the leading foundries have been enabled to secure orders, which will keep them pretty well engaged for some months henceforward. In a previous communication, I have alluded to the fact that these orders are mostly for gas and water pipes, and I may now add that a large proportion of them are destined to be used in the immediate vicinity. There is also a call for castings for colliery purposes—most of the new pits commenced in 1873 and 1874 being iron down to the coal seams, and, consequently, ready for their working plant to be put down. Such of the works as have their own collieries and ironstone are now quoting exceedingly low prices for all kinds of work; in fact, founders and others who have to buy their raw material or pig iron in the open market are quite out of the field at present in all competitive matters.

Local pig iron is only in slight request from these causes, whether for forge or foundry purposes; but there is, for the moment, no disposition to lower prices in the face of the renewed activity of the Glasgow market.

Very little indeed can be said of any branch of industry which has not been said before during the past few weeks. The coalowners are almost despairing, and some of them have deemed it wise and prudent to suspend operations for the time being, until that happy (for them) time shall come when the tendency of prices is again upwards. At fully half a hundred collieries in this district the men are rigidly restricted to two days work weekly, and even this limited output can only be disposed of with some difficulty. The owners, nevertheless, are pretty unanimous in upholding their nominal quotations, although sales are being made at figures very much below these, in the hope that, as soon as the cooler weather sets in, they may be able to declare an advance. There is some little decline in the shipping demand for steam coal for Goole and Hull; but the leading Grimsby shippers, such as Mr. Jossé, are still exporting steadily to France, Denmark, Sweden, Holland, and other countries.

THE LANCASHIRE COAL AND IRON TRADES.

(FROM OUR OWN CORRESPONDENT.)

In both the coal and iron trades of this district there is very little alteration to notice. The demand in the market is very limited, and prices generally are much the same as those last quoted.

In all classes of round coal the market is very dull, and stocks are accumulating. For large orders there is a good deal of competition, and to secure them low prices are quoted; but the current market quotations are generally maintained. Gas coal, although it is still low in price, does not appear likely to give way any further than it has done already, and there is little doubt that, after this month is out, colliery proprietors will be rather stiffer in their prices. The average pit quotations in the Wigan district are about as under:—Good Arley Mine coal, 10s. to 11s. per ton; common ditto, 9s.; Pemberton four-feet, 8s. 6d. to 9s.; screened gas coal, 8s. to 9s.; common coal, 6s. 6d. to 7s. 6d.; burgy, 5s. 6d. to 6s.; and slack, 4s. to 4s. 6d. per ton.

The pits in many of the districts continue working short time, and some of the seams have been closed altogether for the present; generally the coal trade, so far as colliery proprietors are concerned, is in a most unsatisfactory position, and many of the firms are at present carrying on business at a considerable loss.

There is still extremely little demand for coke, and prices are weak. Good Durham cokes for foundry purposes, delivered into this district, are offered at 21s. to 22s. per ton, and best local makes can be got for 19s. per ton.

In the iron market quotations during the week have ruled about as under:—Lancashire pig iron, delivered into the Manchester district, 56s. to 57s. per ton for No. 3 foundry, and 55s. per ton for No. 4 forge; Staffordshire bars, £7 2s. 6d.; Sheffield ditto, £7; Lancashire, £6 17s. 6d. to £7; and Middlesbrough, £6 16s. 6d. to £6 17s. 6d. per ton.

Works are all very quiet; the forges are only working very irregularly, founders are securing very little new business, and many of the general engineering firms are running short time.

THE COAL AND GENERAL TRADE OF THE NORTH OF ENGLAND.

(FROM OUR OWN CORRESPONDENT.)

The coal trade of the North of England is without very much change. Certain qualities of the better class of steam coals are in tolerably active de-

mand. But most kinds of household, gas, and manufacturing coals stand low in the market. The time of year is approaching when the gas-works generally begin to lay in stock, and the shipments of gas coals are pretty considerable. But the price of all kinds, except the very choice, is low. Most of the coals are being bought in the open market, and the contracts made are for much shorter intervals than usual. The wages question in Northumberland will be referred to arbitration.

The freight market is extremely dull. There is very little business doing in the coasting trade, though from the few small sailing vessels in port, rates are without change. Steamers are paid from 4s. to 4s. 3d. per ton to load coals for London. A fair outward business is doing to the Baltic, and several cargoes of steam and gas coals are shipped to the upper ports. Freights to the Mediterranean never were lower than they are at present, and the excellent harvest prospects in this country are keeping down the demand for tonnage from abroad.

There seems to be a little more life in the iron trade of the North of England. The last two markets at Middlesbrough have been steadier. To a large extent financial difficulties in the trade have been tided over. The general trade of the north, however, is very flat, and business has not been depressed over so long a period for a considerable number of years. The chemical market was depressed last week, and some articles were somewhat lower in value.

TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

The annual meeting of the shareholders of the Old Meldrum Gaslight Company was recently held, when a balance-sheet and report by the auditors upon the affairs of the company for the year ending June 30 last were submitted. It was agreed to pay a dividend of 5 per cent., and to reduce the price of gas to 10s. 5d. per 1000 cubic feet, which is also to include the cost of supplying gas to the street lamps.

At the annual general meeting of the New Pitsligo Gaslight Company lately held, the abstract of the income and expenditure for the past year was read and confirmed, and the directors declared a dividend of 5 per cent. upon the paid-up shares.

A few days ago the Police Commissioners of Maxwelltown, which is a suburb of Dumfries, but separated from it by the river Nith, held a statutory meeting, at which a letter was read from Mr. Malam, gas manager, Dumfries, offering to supply the public lamps with gas at 5s. 6d. per 1000 cubic feet, and intimating that the company would light and extinguish them, and charge for doing so as in Dumfries. The chairman said this was 6d. less than was charged last year, and suggested that it be remitted to the committee, to come to an arrangement with the gas company. One of the commissioners protested against the committee having such powers, and said the company were charging them 6d. more than in Dumfries, and meant to charge them £1 a week for lighting and extinguishing; that they were threatening to cut off the supply if the burgh did not come to their terms, and that rather than consent to such an arrangement he would have the town lighted with paraffin lamps, which would give a better light and be cheaper. He moved that the committee be instructed to try some oil lamps. Ultimately the whole matter was remitted to a committee.

The directors of the Anstruther and Cellardyke Gas Company have unanimously appointed Mr. Thomas A. Dalzell, tinsmith and general merchant, to the situation of gas manager, vacant by the resignation of Mr. John Adamson, who had discharged the duties for over 30 years.

On Friday week, a somewhat alarming accident occurred at the Tillicoultry Gas-Works. The new gasholder had been leaking, and was deemed insufficient, and in order to get the bottom of the tank, which is formed of cement concrete, properly repaired, the large holder was raised by dumbcrafts supported on pillars. The means employed were considered sufficiently strong to sustain the heavy weight placed upon it; but from some cause or other the supports gave way, and the large holder fell with a tremendous crash, causing great alarm over the neighbourhood, and it was thought, from the noise, that a gas explosion had taken place. Fortunately none of the men engaged at the works were injured, but the amount of damage done was considerable.

The average illuminating power of the Greenock Corporation gas for the month of July, as tested daily in the gas office in Greenock, which is about three miles from the works, was 28·58 standard candles; and the result of the daily testings at the works was 29·25 candles.

Dr. Wallace's report on the Glasgow gas for the week ending the 12th of August, as produced at three of the stations, gives the highest maximum at 29·08 candles, which was at the Dalmarnock station, where there was also the lowest minimum, namely, 25·83 candles. The gas at that station also showed the pressure of 13·09 grains of sulphur, and ·12 grain of ammonia, per 100 cubic feet.

At the meeting of the Town Council of Edinburgh on Tuesday last a report upon the quality of the gas supplied in that city was given by Mr. J. Falconer King, the gas analyst. It stated that the Edinburgh Company's gas showed an average illuminating power of 29·32 candles, and that of the Edinburgh and Leith Company was 30·07 candles.

At a meeting of the local authority of Strathmiglo last Saturday a report was submitted from Dr. Stevenson Macadam on seven samples of water from the district sent him for analysis. They all possessed more or less unwholesome properties, while some of them were contaminated to a considerable degree with putrescent organic matter, and were generally impure. Dr. Macadam recommended the discontinuance of the latter for dietetic or drinking purposes. No decision was arrived at regarding the report.

The last monthly report on the Kirkcaldy water supply stated that the quantity of water passed through the pipes per day was 786,000 gallons. Of that quantity 19,500 gallons went to Wemyss Castle and village, 160,000 for the supply of the public works, leaving 606,000 gallons for the supply of the inhabitants, or 26¼ gallons each to a population of 23,000.

At the last meeting of the Town Council and Police Commission of Dunfermline, it was unanimously agreed to empower the Water Trust to ascertain on what terms the engineers would undertake to furnish working plans, and superintend the construction of the new water-works, and to report to next meeting. The provost urged that the matter should be proceeded with at once, so as to get the benefit of the low price of iron in making the contract for the pipes.

Mr. J. F. Bateman, C.E., has just sent an interesting report to the Police Commission of Forfar on the scheme of water supply which he proposes for that town. It is to be brought under the consideration of an early meeting of that body.

Since last report there have been some reductions in the price of makers special brands of pig iron. Gartsherrie No. 1 has been reduced 1s. per ton, and several brands 6d. per ton. Foreign shipments of Scotch pig iron have recently been very low, and the decrease for the present year is already about 70,000 tons. Both in the warrant stores and in the makers yards the stock is increasing somewhat rapidly, yet still there is no appearance of any further reduction in the making power at the blast furnaces, 115 of which are in operation, as against 116 at the same time last year. The pig iron market of the past week closed on Friday with a limited business done at 56s. 3d. cash, and 56s. 4½d. cash in 14 days. In the afternoon sellers were only asking 56s. 3d. cash.

The coal market has been somewhat quieter during the past week. Most of the coalmasters are now quite abreast of their shipping orders, which makes future contracts difficult to arrange at present quotations; indeed, that can only be done by meeting buyers a little in regard to prices.

REDUCTIONS IN THE PRICE OF GAS.—The Liverpool United Gas Company have announced a reduction in the price of gas to the uniform rate of 4s. per 1000 cubic feet, such reduction to take effect from the 1st of October next. At Willingborough the price will be reduced from 4s. 9d. to 4s. 6d. at Michaelmas, and at Melton Mowbray to 4s. 7d.

WATER-PIPES FOR BOMBAY.—The contract for the 18,000 tons of cast-iron pipes required for the Bombay Water-Works has been let to Messrs. Laidlaw and Maclaren, of Glasgow. We may add that Mr. John R. Manning has been appointed the engineer in England to the Municipality of Bombay.—*Engineering*.

DEAL PUBLIC LIGHTING.—The dispute between the Corporation of Deal and the gas company has been amicably adjusted, and at the quarterly meeting of the Town Council on the 14th inst. it was announced that a letter had been received from the company stating that the directors were willing to accept the council's offer of 4s. 6d. per 1000 for lighting the public lamps, the council to have the control of the same.

WELLINGBOROUGH GAS COMPANY, LIMITED.—The annual meeting of this company was held on the 14th inst., when a dividend at the rate of 10 per cent. was declared, and the proposal of the directors to reduce the price of gas from 4s. 9d. to 4s. 6d. per 1000 feet from Michaelmas next was unanimously approved. Mr. John Wood Sharman was re-elected chairman, and Mr. Chas. Pell, auditor. A donation was voted to the works manager (Mr. G. Powell), who has been in the employ of the company for 30 years.

BEVERLEY CORPORATION GAS SUPPLY.—At the meeting of the Town Council on the 14th inst., the Gas Committee reported that for a considerable period they had been in correspondence with the War Office authorities relative to the supply of gas to the new barracks, and now recommended that gas be supplied at the usual rate, the War Office to be at the entire cost of the pipe from the barracks to Keldgate, and to contribute £125 towards the cost of a new main, as well as pay all the expenses in relation to obtaining the consent of the trustees of the road to the laying of the pipe. The report was adopted.

PONTEFRACT GAS COMPANY.—At the half-yearly meeting held Wednesday, the 16th inst., the report stated that the amount divisible amongst the shareholders was £689 17s. 10d., out of which the directors recommended the payment of a dividend for the half year ending the 30th day of June, 1876, at the rate of 8 per cent. per annum, clear of income-tax. The directors had to report that the contractors for the new gasholder and tank were making satisfactory progress with the work, and that the business of the company was still increasing. The works and plant were in good working order and condition. The dividend will be payable on the 1st of September next.

MELTON MOWBRAY GAS COMPANY.—The half-yearly meeting was held on the 11th inst.—Mr. G. Fitton in the chair. The accounts were highly satisfactory. The meeting adopted the recommendation of the directors to declare a dividend of 20s. per share for the half year. Although an outlay of £600 is being proceeded with, the meeting agreed to a recommendation to further reduce the price of gas to consumers, from the 1st of October next, to 4s. 7d. per 1000 feet, the lowest price hitherto obtained there. The retiring directors were re-elected. In consequence of the above reduction in the price of gas, the town lamps have been lighted fourteen days earlier, and will be continued fourteen days later in the spring than heretofore. This change will make the lighting term ten months out of the twelve.

WEYMOUTH CONSUMERS GAS COMPANY.—The annual meeting was held on Thursday—Mr. Robert Damon, chairman of the board of directors, presiding. The secretary read the financial statement for the past half year, after which came the report of the directors, recommending a dividend of 8 per cent., a bonus of 3s. 6d. on the old shares, and a dividend of 7 per cent. per annum on the new shares. The chairman stated that there would be a call of £1 per share on the new shares in a few days. On the proposition of the chairman seconded by Mr. Miles, the report was adopted. Messrs. Robertson, Thomas, and Lundie were re-elected directors. On the proposition of Dr. Smith, seconded by Mr. Reynolds, a vote of thanks was accorded to the directors for their past services, and 100 guineas were voted to them. Mr. Rolls opposed the proposition, but he had no seconder. Mr. Milledge was elected auditor in the place of Mr. Hallett.

COLNE VALLEY WATER COMPANY.—The ordinary general meeting of this company was held on the 17th inst., at the Charing Cross Hotel—Viscount Malden, the chairman, presiding. The directors report referred to the recent opening of the works, and Mr. Bateman, the company's engineer, spoke of the rapid increase in the customers. A report from Dr. Frankland was also given, in which he spoke highly as to the quality of the water. The chairman, in moving the adoption of the report, expressed the satisfaction of the board in being able to announce the formal opening of the company's works. Everything was working very satisfactorily, and applications for their water were coming in from all directions. The resolution for the adoption of the report was seconded and carried, after which some routine business was transacted, and the proceedings terminated with a vote of thanks to the chairman and directors.

HULL GAS SUPPLY.—Mr. James Baynes reports that the gas supplied to the district of Sculcoates and Myton by the British Gas Company during July was constantly free from sulphuretted hydrogen and free ammonia; the results for illuminating power and sulphur compounds are—

	Max.	Min.	Mean.
Illuminating power standard sperm candles	16·12	15·40	15·76
Grains of sulphur per 100 feet	29·00	27·30	28·00

Mean barometer and temperature in experiment-room:—Bar., 30·18; tem., 65°.

In the east district, Mr. James Baynes, jun., reports that the results of the examination of the gas supplied to the above district by the Sutton, Southcoates, and Drypool Gas Company during the month of July are as follows:—

	Max.	Min.	Mean.
Illuminating power standard sperm candles	16·28	14·26	14·95
Grains of sulphur per 100 feet	—	—	7·86

Mean barometer and temperature in experiment-room:—Bar., 29·87; tem., 66·5°.

INSTITUTION OF CIVIL ENGINEERS.—The council of this institution invite communications, during their ensuing session, upon the following and other subjects:—"On the Flow of Fluids, Liquid and Gaseous;" "On the Water Supply of Towns, including a Description of the Sources of Supply, of the Different Modes of Storing, Collecting, and Filtering Water, of the Various Incidental Works, of the Distribution to the Consumers, and of the General Practical Results;" "On the Constant Service of Water Supply, with Special Reference to its Introduction into the Metropolis, in Substitution for the Intermittent System;" "On the Various Modes of Dealing with Sewage, either for its Disposal or its Utilization;" "On the Relative Cost of the Conveyance of Coal by Rail and by Steamer, and on the Best Mode of Loading and Unloading to Diminish Breakage;" "On the Various Descriptions of Pumps employed for Raising Water or Sewage, and their Relative Efficiency;" "On the Use of Gas as a Motor;" "On the Manufacture of Mineral Oils, and the Lamps best adapted for their Consumption in Dwellings and Lighthouses;" "On the 'Output' of Coal in the United Kingdom, as compared with that of other Countries, illustrated by Statistical Tables, Plans, and Diagrams, showing where Coal is Produced, and Where and How it is Consumed;" "On the Sinking to, and Machinery applied at, Deep Coal Mines (in Saxony, for instance), with a Notice of the Modifications necessary in Future Coal-Mining Operations, suggested (or indicated) by the Working of Deep Sinkings;" "On the Washing of Small Coal, and the Manufacture of Coke and Artificial Fuel."

NEWPORT (MON.) GAS COMPANY.—The half-yearly meeting was held on the 14th inst.—Mr. T. Gratrex in the chair. The report of the directors showed that the available balance was £2310 9s. 4d., out of which the payment of the usual dividends on the A and B stocks, and also payment at the rate of 7 per cent. on the new shares, was recommended, leaving a balance of £440 4s. 4d. to be carried forward. In moving the adoption of the report, the chairman remarked that it was gratifying that they were enabled to declare what they regarded as their usual dividends. At the present time their expenses were unusually heavy, in consequence of the new works now in progress, but which they found it necessary to carry out. Explanations were given as to the nature and extent of the works in progress and in contemplation, and the report was deemed satisfactory. It was then resolved—"That dividends at the rate of 5 per cent. on class A stock, 3½ per cent. on class B stock, and 3½ per cent. on class C stock, for the half year ending June 30, 1876, be declared payable on the 21st inst." Mr. Gratrex (the chairman) was re-elected a director, and Mr. Tom Llewellin Brewer was elected a director in the room of Mr. Jehoiada Brewer, deceased. Mr. John Cole was re-elected auditor. The business terminated with the usual vote of thanks to the chairman.

MEXBOROUGH WATER SUPPLY.—At the meeting of the local board for this district on Thursday last, a letter was read from Mr. Green, geological surveyor, expressing an opinion that it would be imprudent to sink a well near Denaby Colliery, as had been suggested. There was a plentiful supply, but it came chiefly from the river, and though it might be partially purified by percolation through the gravel, yet it would be unfit for domestic use. Neither would it be wise to get the supply from the sandstone rock, on which the town stands, as there would be danger of its being polluted by the sewage. The outbreak of typhoid fever at Wombwell was traced to this cause. The best scheme was to obtain water from the Oaks Rock, as there was evidence that the quality was good and the supply abundant. A letter was also read from Mr. Tomlinson, of Rotherham, proposing to supply the town from Rotherham Water-Works at 6d. per 1000 gallons, the cost not to exceed £5000; or he proposed to obtain a supply of water in Mexborough and complete the scheme for £4000. The St. Helen's and Ludwell Springs scheme, however, was most in favour. It was stated that 260,000 gallons per day could be obtained from that source, and conveyed to most parts of the town by gravitation alone. It was agreed to take steps for making these springs available.

PENNSYLVANIA COAL SUPPLY.—Mr. Andrew Roy estimates the available coal of the Allegheny coal-field at 743,424,000,000 tons—an amount nearly ten times greater than the estimates made by E. Hall and W. Smith of the coal resources of the British Isles. The same writer states the aggregate thickness of workable coal in the anthracite regions of Pennsylvania as 200 feet, in 2175 feet of coal measures. In the bituminous regions of this State, near Pittsburgh, he estimates 60 or 70 feet of workable coal to 2000 feet of coal measures. In West Virginia, where the Kanawha River cuts the coal measures to their base, 78 feet thickness of coal in 16 seams is revealed; and along the Ohio, from Bellaire to Pomeroy, the proportion is 40 or 50 feet of coal in 1200 to 1400 feet of rock. The number of workable seams, and consequent thickness of coal in every division of the coal area, are in proportion to the thickness of the carboniferous rocks. Beginning at the base of the coal measures, and reaching up to the height of 400 feet, to the base of the barren measures, there exists in the bituminous regions 3 feet of coal for every 50 feet of strata. The next 400 are generally barren of workable coal, but from the Pittsburgh seam, which is the lowest bed of the upper series, to the outcrops, or top of the coal strata, the same general estimate of 3 feet of workable coal to every 50 feet of strata will hold good. —*Iron*.

HUDDERSFIELD CORPORATION GAS SUPPLY.—At the meeting of the Huddersfield Town Council on the 16th inst., the Mayor (Mr. J. F. Brigg) presiding, the town-clerk read the report of the Gas Committee, from which it appeared that, at a meeting of the Executive Sub-Committee, held on the 26th ult., the manager reported that Mr. Wilson, silk manufacturer, Dalton, had refused to allow the inspectors to examine and water his gas-meter, unless he was present with them. Resolved—"That the manager write Mr. Wilson that the Gas Committee will not allow the meter inspectors to be interfered with in their duties, and should he persist in doing so, the penalties prescribed in the Gas-Works Clauses Act will be enforced." At a meeting of the Special Sub-Committee, on the 2nd inst., Mr. Midgley attended, and his position and claims in relation to the gas supply of Almondbury were further considered and discussed, and it was resolved—"That the sub-committee are unable to recognize any ground of legal or equitable claim by Mr. Midgley against the corporation, beyond the £650 already paid to him, which being greatly beyond the selling value of his pipes and mains, was really meant to cover the other claim now brought forward; but under the special circumstances of the case, and in deference to Lord Redesdale's wish for it to be reconsidered, the sub-committee recommend that a further sum of £100 be offered to Mr. Midgley, provided he will receive it in complete satisfaction of all his claims against the corporation." At a meeting of the Gas-Works Sub-Committee, on the 8th of August, it was resolved—"That the proceedings of the sub-committee, as now read, be confirmed, excepting those of the Special Sub-Committee with reference to Mr. Midgley's claim, which last-mentioned proceedings, and the recommendation of a further payment to Mr. Midgley, be not adopted or confirmed, but negatived." The borough accountant submitted a statement or half-yearly balance-sheet of the gas-works for the half year ending June 30, 1876, showing a balance of profit on the half year's working of £2559 9s. 8d., to be carried to the borough fund account.

PRESTON CORPORATION WATER-WORKS.—The *Builder* states that the Corporation of Preston have just decided to take legal proceedings against the sureties of a late contractor in respect of the execution of some new works in connexion with their water supply. The case is of a somewhat curious nature. It appears that about six years ago the corporation advertised for tenders for the construction of a new conduit, and received eight. There was a remarkable difference between the highest and the lowest—the highest being £58,000, and the lowest £29,000, which was sent in by Mr. Robert Carlisle, of Blackpool. This tender was ultimately accepted by the corporation, although it appears that the engineer gave it as his opinion that the work could not possibly be executed for the amount named, and that the contractor must have made a mistake in his calculations. Mr. Carlisle undertook to complete the work in two years, and three sureties became responsible for 10 per cent. on the amount of the contract. The work proceeded very unsatisfactorily, and, in June, 1871, the contract was determined, the corporation taking possession of all the contractor's tools and plant, which were valued at £1600, and, as is stated, exonerating the sureties. In the meantime Mr. Carlisle died. The corporation again advertised for tenders, the lowest being £46,000, which was afterwards withdrawn, and the corporation then proceeded with the work with the assistance of their own engineer, under the powers of Mr. Carlisle's tender. The works were finished twelve months ago, and cost about £55,000, the deficiency between the amount of Mr. Carlisle's tender and the actual cost of the works being £26,000. It is stated that the works could not have been completed for less than they have cost, and that the corporation, having got possession of the late contractor's plant without payment, have secured the works at less than their actual cost. In justification of the course which they are pursuing, however, they state that, although they are anxious to show every consideration to the sureties, to let them off *in toto* would be destructive of all value of suretyship in respect of contracts for such works. On the other hand, it is said that the sureties intend to dispute their liability, on the ground that they were exonerated at the time when the contract was determined. The amount claimed is £8600.

PETROLEUM TANKS IN PENNSYLVANIA.—Besides the spiders web-like pipes which spread in all directions on the surface of the ground in the oil regions, an equally, if not more, noticeable feature of the landscape is supplied by the huge gasometer-shaped tanks in which crude petroleum is stored. We learn from the *American Manufacturer* that a carefully prepared map has been published by Mr. Henry E. Ungley, of Titusville, giving the location, size, and capacity of every tank in these regions. It is interesting as showing the immense proportions which the petroleum business has attained. A summary of the statistics shows that there are 370 tanks, with a total capacity of 6,077,225 gallons. The largest tank is one owned by Lockhart and Frew, at Pittsburgh, the capacity of which is 43,000 barrels. The second in size is one owned by the Pennsylvania Transportation Company, at Brady's Bend, holding 26,442 barrels. There are 133 tanks holding from 20,000 barrels upwards, and the average capacity of the whole tankage is 16,425 barrels. At the present rate of production this tankage will contain the whole product of the oil regions for over ten months.—*Iron*.

RETFORD PUBLIC LIGHTING.—At the quarterly meeting of the Retford Town Council, on Monday, the 14th inst., a communication was read from the secretary of the gas company (Mr. W. Newton) addressed to the mayor. The writer said he was instructed by the directors of the East Retford Gas and Coke Company, Limited, to communicate with the Urban Sanitary Authority for East Retford on the subject of the complaints which have been made from time to time at meetings of the authority, and reported in the public press, as to the lighting of the town. "The company, he continued, contract to supply for every public gas lamp gas to burn for 2000 hours, between Sept. 1 and April 30; the price, including the providing, and repairing, lighting, and extinguishing of the lamps being £2 18s. per lamp. During the past season the company have kept each public lamp burning 200 hours in excess of the stipulated number of hours. The directors have tested the quantity of the gas consumed at each lamp, and have made careful inquiry as to the result thereof, and taking the gas at 3s. 6d., per 1000 cubic feet and taking into account the cost of lighting the town hall clock, they find that they lose £97 per annum by their contract with the authority. Under these circumstances the directors think that the company have not furnished any just cause for the complaints which have been made; and, observing that at a meeting of the authority you are stated to have said that the authority ought to purchase the company's works, they have instructed me to say that if the authority concur in your opinion the directors will recommend their company at once to meet the wishes of the authority in this respect. If the authority do not wish to purchase, then the directors propose that a new contract be at once entered into on the following basis:—1. That the company no longer provide the lamps; 2. that the sale of gas be by meter; 3. that the company be relieved from the duty of lighting and extinguishing the lamps." This note was addressed to G. Cutts, Esq., the Mayor. A long discussion followed, and ultimately a motion, moved by Mr. Spurr, was unanimously agreed to—"That a special committee, consisting of the Mayor, Alderman Jenkinson, Alderman Beeley, and Councillors Appleby, Hindley, Gyles, and Spurr, be appointed, to negotiate with the gas company upon the matter."

BLACKROD GAS COMPANY.—On Wednesday last this company held their sixteenth half-yearly meeting in the gas offices, situate at the works in Grimeford Lane. Mr. Thomas Lowe in the chair. The following report of the directors was read by the secretary (Mr. James Saunders):—"The accounts of the company for the past half year will be laid before the meeting, and they have been examined and approved by your auditor. These accounts show an increased profit, although the repairs of the works have been more than usually heavy. There has been a very considerable leakage in the pipes, and consequent loss of gas, owing to the sinking of the ground from under which coal has been worked. This has now been effectually remedied, but it has greatly reduced the balance we should otherwise have had in hand at the end of the half year. On the other hand, however, the consumption of gas continues steadily to increase, and there can be little doubt that before long the consumption will be such as to yield a very fair profit, and we may hope for a reasonable dividend even upon the large amount of capital invested. The sum applicable for dividend, as shown by the profit and loss account, is £163 11s. 8d., and the directors recommend that a dividend of 5 per cent. per annum, free of income-tax, be declared for the half year. In pursuance of the special resolutions of the shareholders, application was made to Parliament for the purpose of incorporating the company and obtaining statutory powers. The bill was opposed by several petitioners, including the Blackrod Local Board, all of whom were amicably settled with. The bill received the Royal Assent on July 24, from which date the limited company will be dissolved. By the terms of the new Act the company are empowered to supply with gas the townships of Blackrod and Anderton, and also the Lancashire and Yorkshire Railway Company in Adlington. The capital of the company, as fixed by the Act, is £20,000; £10,000 of which is to be called original capital, and £10,000 additional capital, and the borrowing powers are £2500 in respect of the original capital, and also the like sum in respect of the additional capital. The dividends payable are not to exceed 10 per cent. on the original capital, nor 7 per cent. on the additional capital issued as ordinary capital, or 6 per cent. in respect of any capital issued as preference capital. The maximum price of gas is fixed by the Act at 5s. 6d. per 1000 cubic feet. The Act contains all the usual provisions relating to gas-works, and is of considerable value to the company, inasmuch as they have thereunder the exclusive right to supply gas in the townships of Blackrod and Anderton, and the Lancashire and Yorkshire Railway Company in Adlington. The first directors appointed by the Act are Messrs. John Dickinson, Daniel Gerrard, Robert Critchley, Thomas Lowe, Thomas Orrell, Benjamin Howarth, William Foster, Joseph Ollerton, John Ashurst, Richard Mather, and James Elliott. This will be the last meeting of the shareholders of the limited company, and the first ordinary meeting of the new company will be held in due course." It was moved by Mr. E. A. Greenwood, seconded by Mr. R. Critchley, and resolved—"That the directors report and balance-sheet as now read be passed, and that a dividend after the rate of 5 per cent. per annum be declared payable by the company's bankers at Chorley, on and after the 22nd inst." It was moved by Mr. G. W. Chaster, seconded by Mr. W. Caldwell, and resolved unanimously—"That the best thanks of this meeting be passed to the chairman and directors, for the manner in which the business of the company has been conducted during the past twelve months."

HARROGATE PUBLIC LIGHTING.—The local board of this place have, after one year's experience of petroleum lamps, retrograded (?) to gas.—The history of this dispute is as follows:—A clause was inserted in the Harrogate Gas Company's Act requiring the local board to provide their own lamps, &c., or pay an annual rent to the gas company. Since 1863 the local board have rented the lamps, posts, and fittings of the company. In 1875 they purchased these, and entered into a contract with the company for a supply of gas under the average meter system. But they purchased meters and regulators without consultation with the gas company. As these meters and governors did not comply with the contract, the company would not accept them, but offered to accept others from makers of repute. Thereupon the local board forthwith attempted to light the public lamps with petroleum oil, and purchased 300 lamps of a certain description for the purpose. The result was that an average of about 70 lamps were either blown out or so blackened with smoke that it was difficult to say whether they were lighted or not; and the cost has been upwards of £200 in excess of what would have been the cost of gas. The general expression of disgust is so pronounced that, notwithstanding the amount of capital which has been sunk in these lamps, meters, &c., the board have not dared to attempt another season of petroleum, but have asked the gas company for their terms for gas, which they have accepted—doing away entirely with the meters which the gas company would not approve, altering the governors so as to meet the company's requirements, and adopting, by advice of the company, the same kind of meters which

are in use at St. Pancras. The local board also appear to be now satisfied that the company's objection to the meters and governors provided by themselves was valid, and that they ought not to have made such a purchase blindfold; and they have entered into a contract with the company on the same terms as the previous contract which they (the local board) would not fulfil. The gas company have only claimed from the local board the actual money out of pocket in legal expenses, as there would have been some difficulty in proving damages, seeing that the street lighting for some years has proved an annual loss to the company.

PROPOSED PURCHASE OF THE LICHFIELD GAS-WORKS.—On the 10th inst., at a meeting of the Town Council of Lichfield, the further consideration of the gas question was resumed. At a former meeting it was reported that the Local Government Board declined to sanction the proposed purchase of the undertaking of the gas company, under the 162nd section of the Public Health Act, 1875, unless a Provisional Order, under the Gas and Water Works Facilities Act, 1870, was first obtained by the council. The ground for this decision on the part of the board was that the gas company possessed no Act of Incorporation. On this the town-clerk addressed a letter, in the following terms, to the secretary of the board:—

Referring to your letter of the 29th ult., in reply to the application of this council for the approval by the Local Government Board of their contract with the gas company, I desire to supply an apparent omission in my letter containing the application. The local Act referred to therein, but not recited, 46 Geo. III., has this clause [omitting expletives]: "It shall be lawful for the said commissioners [now the council by transfer], and they are empowered to provide lamps, lamp-irons and posts, set them up, and cause them to be lighted and kept burning in the streets, lanes, &c." Reading the above in conjunction with sec. 162 of the Public Health Act cited in your letter, this council, before entering into the provisional contract, were under the impression that no further parliamentary powers were required. I should add that the Cathedral Close now lighted by the company is absolutely exempted from the operation of the above local Act, being at that date in the county of Stafford, and is still excluded unless the Parliamentary and Municipal Acts, which place it in the city and county of Lichfield, can be considered to override the exempting clause. The latter Act, 5 and 6 William IV., cap. 76, sec. 87, it should be observed, gives power to the council, where a local Act for lighting exists, to make an order as to any part of the borough not within the provisions of the local Act, whereupon the council shall be authorized to light and levy a rate therefor.

No reply to this communication had been received. The discussion which followed contemplated the present position of the council and the gas company. The 19th clause of the contract fixed the 15th instant as the day to complete the purchase, and the penal portion of that clause was to the effect that failing compliance the contract would be void. It was suggested that the mayor, with the town-clerk and a member of the council, should at once proceed to London and have an interview with the authorities at the Local Government Office, in order to place before them the particulars of the case, and to urge concurrence in the views expressed in the town-clerk's letter. Mr. J. Gilbert directed attention to the question, as to what should be done if the deputation failed in its object, and eventually it was resolved that in such a case the council should bind themselves to take the necessary steps to obtain the sanction of the Legislature, and that the gas company should be requested to defer the date of the completion of purchase accordingly. It was also resolved that the Local Government Board be requested to grant the suggested interview with the deputation at once.

GRANTHAM GAS COMPANY.—The fourth ordinary general meeting of this company was held on Thursday, the 10th inst., at the Guildhall, Grantham—Mr. J. F. Burbidge, presiding. The clerk read the notice convening the meeting, also the following report:—"Your directors have great pleasure in laying before their shareholders the present satisfactory statement of their position, the result of the indefatigable industry and talent of their manager, Mr. Barratt. They are happy to state that their finances will allow them to recommend the payment of a dividend for the past year of 10 per cent., free from tax; and they have the further gratification of informing consumers of gas that they have determined to reduce the price from 5s. to 4s. 7d. per 1000 feet from the 1st of July last. The dividend will be payable on and after the 15th inst." The statement of accounts was also presented to the meeting. The capital account showed a total of £28,250. In the revenue account, the receipts amounted to £6259 3s. 10d., and the disbursements to £3352 8s. 8d., leaving a balance in favour of the company of £2906 15s. 2d. The gas and meter rents realized £3286 10s. 7d.; public and private lamps, £294 15s. 3d.; coke, £588 16s. 6d.; tar and lime, £199 13s. 8d.; ammoniacal liquor, £113 0s. 2d. The expenditure on coal and carriage amounted to £1572 16s. 8d.; on maintenance of works, £493 10s. 1d.; new retorts, £271 9s. 10d.; services and repairs, £166 15s. 5d. The chairman said he had great pleasure in stating (as the shareholders would observe from the report) that the company stood in a very satisfactory position—a position they had been trying to arrive at for years past, but had never been able to do so before the present. He had great pleasure in proposing that a dividend of 10 per cent. be paid out of the profits of the company. The motion was seconded by Mr. Ridge, and agreed to. The chairman then proposed that the price of gas be reduced from 5s. to 4s. 7d. per 1000 feet, which was seconded by Mr. Johnstone, and carried. This concluded the business of the meeting. A vote of thanks to the chairman for his very able services during the past twelve months, and for the time and attention he had given to the interests of the company, was carried unanimously. The chairman thanked the shareholders for this expression of their confidence, and said he had tried to do the best he could for the interests of the company, but they must be aware that himself and the directors could have done very little without the assistance of their able engineer and manager, Mr. Barratt. He was sure he could not say too much in his favour, as their present very satisfactory position testified. He considered they were fortunate in having such a man, and he had the greatest pleasure in proposing that a very hearty vote of thanks be given to Mr. Barratt, the company's engineer and manager. The motion was carried unanimously. Mr. Barratt thanked the shareholders for this kind expression of their approval of what he had done, and assured the meeting he could not have effected much without the assistance and wise counsels of the directors and the clear head of the chairman. They had listened to every alteration he had proposed, and not one penny had been spent but what he believed would conduce to the benefit of the company, as their present very prosperous position he thought would prove. Their new machinery was working well, and he believed their works would bear comparison with any in the country as a gas manufacturing establishment. So long as health was given him, he saw no reason why they should not only continue as prosperous as at present, but also improve, assuring them that he would seize hold of any improvement which was likely to be of any benefit to the company.

Register of New Patents.

1872.—BABLON, V., Paris, "*Improvements in photometers or photo-phlogometers for measuring the intensity of the lighting power of gas in accordance with the size of the flame.*" Patent dated May 21, 1875.

The object of this invention is to establish the flow of a volume of gas always rigorously equal to itself at all times, no matter what the density of the gas. Such a flow being established, the simple measure of the dimensions of the flame then suffices to indicate the lighting power of the gas. The flow of this constant volume is obtained not by aid of regulators, but by means of a capacity whence the gas is always expelled at an equal speed. This constant expelling capacity may consist—1. In a fly of a meter receiving from an external mechanism an uniform rotary motion. 2. In a gas meter bell suspended by a cord to the barrel or wheel-work of a clock mechanism, and descending with a speed rendered constant by this mechanism. 3. And specially in a bell whose speed of immersion, and consequently of expulsion, is regulated in the following manner:—This bell is quite surrounded by a closed reservoir, which only communicates with the atmosphere by a straight and narrow orifice, in such wise that, as the bell descends and drives the gas it contains, it draws in an equal quantity of air above it. The speed of entry of the air may thus serve as measure of the speed of exit of the gas; and, as the orifice of admission of air is of invariable size, a similar degree of rarefaction of the air above the bell will always indicate a like speed of descent of the bell. A manometer indicates the impression produced above the bell, and a tap placed on the exit tube of the gas admits by opening it, of leading the manometer always to exactly the same point, and thus producing the flow of a volume of gas always rigourously equal to itself.

1891.—WOODALL, C., Phœnix Gas Works, Vauxhall, and WILLS, T., Brixton, "*Improvements in the means of and apparatus for the purification of gas.*" Provisional protection only obtained. Dated May 24, 1875.

This invention relates to a method of and apparatus for the better purification of gas from ammonia, carbonic acid, sulphuretted hydrogen, bisulphide of carbon, and their compounds, being accomplished by the injection into certain washers or scrubbers, or system of washers or scrubbers, either of the ordinary or some special form of a combined jet or jets of steam and water, or of steam and ammoniacal liquor, purified or not, or of sulphide of ammonium specially prepared, or of some other liquid purifying agent calculated to remove any or all of the above-mentioned compounds.

The use of water, purified ammoniacal liquor, or sulphide of ammonium is not new; but the application of these liquids through the intervention of a compound jet or jets, consisting of one tube inserted within another, the outer one being used for the delivery of the liquid and the inner one for the injection of the steam, whereby the gas is subjected to a more effectual washing is new; as is also the use of crude ammoniacal liquor by means of the said jet or jets for the removal of sulphur compounds from gas which has been previously freed from carbonic acid.

1895.—HILLS, F. C., Deptford, "*Improvements in the purification of gas, and in the preparation of materials to be used in the said purification.*" Patent dated May 24, 1875.

This invention consists in separating the sulphuretted hydrogen of gas from the carbonic acid gas driven off from gas liquor, while it is being purified by the process patented by the present patentee (Nos. 1369, 1868; and 934, 1874), and utilising such sulphuretted hydrogen gas to form sulphide of ammonium, which may be used for purifying gas from bi-sulphide of carbon.

The sulphuretted hydrogen may also be used to form other sulphides, some of which (*e.g.*, sulphide of calcium) are also useful for purifying gas from bi-sulphide of carbon.

Sulphide of ammonium may also be made by passing the sulphuretted hydrogen and carbonic acid gases driven off from gas liquor, as aforesaid, through scrubbers, down which gas liquor is caused to pass.

1932.—MILLS, B. J. B., London, "*Improvements in liquid-meters.*" A communication. Provisional protection only obtained. Dated May 26, 1875.

This invention relates to that class of liquid meters in which a screw is employed as the measuring means, and consists principally in the arrangement of the various parts, whereby the meter is cheapened and improved.

1948.—COPP, W. L., and WHITE, C., Watchet "*Improvements in apparatus for the manufacture of gas.*" Patent dated May 27, 1875.

This invention has already been described and illustrated in this number. (See p. 278 *ante*.)

1950.—WOOD, D., Lavenham, "*Improvements in wrenches or spanners.*" Provisional protection only obtained. Dated May 27, 1875.

This invention relates to an improved mode of constructing wrenches or spanners for gripping and turning nuts, pipes, or similar articles; and consists essentially in the application to one of the jaws thereof of a cam or moveable piece pivoted eccentrically, and so shaped or arranged that by turning such cam-piece on its centre into different positions, the wrench or spanner will be capable of receiving nuts or other articles of various sizes.

1955.—LIVESEY, G. T., South Metropolitan Gas-Works, London, "*Improvements in apparatus used in the purification of gas.*" Patent dated May 28, 1875.

A description of this patent will appear in the next number of the JOURNAL.

1965.—WEST, J. J., Chicago, U.S.A. "*Improvements in gas-stoves.*" Provisional protection only obtained. Dated May 28, 1875.

This improved stove consists of an outer case and internal chamber fitted with vertical pipes for the passage of gas and atmospheric air, which are diffused and passed through two diaphragms and perforations in the outer case; the gas is then ignited, and burns at the edge of an outer flange encircling the case.

1994.—BROOKES, W., Chancery Lane, London, "*Improvements in means or apparatus for conducting and controlling the flow or passage of water, gas, or other fluids or vapours.*" A communication. Patent dated June 1, 1875.

One part of these improvements consists in forming on each pipe-end a short conical projection, or spigot, capable of fitting into a corresponding short conical depression, or socket, made to receive it, in a tubular joint-piece, used for connecting the pipes together; or in forming the short conical socket on one end of the pipe, and a short conical projection, or spigot, on the other end, the effect of this form of pipe being that less metal is required for a given length of piping than when the ordinary socket-joint is used. The pipes have lugs cast upon them for the insertion of bolts to secure them together.

The valves of the valve-boxes are made to rest directly on their seats, being ground so as to make a tight joint therewith, or the valves may have upon them an annular conical projection, taking into a circular groove of corresponding form made in the seat, or the annular projection may be upon the seat, so as to take into a corresponding groove made in the valve. The valves are actuated by means of a rod or stem connected thereto by a pin or otherwise, a slight amount of play being allowed to the valve for it to adjust itself readily upon its seat, by its rod, or stem, having upon it an india-rubber or other elastic washer. Motion may be given to the valve-rod, or stem, either by a screw or spring, a double circular inclined plane, a lever or eccentric, or other suitable means.

In the taps, or cocks, there is a hollow plug, open at bottom, fitting loosely into a barrel, and kept tight therein by elastic packing inserted between it and the inner surface of the barrel, a suitable passage being formed through the plug and barrel for the outlet of the fluid. The cocks or taps may also be made by inserting a tube of india-rubber into a tubular, or other suitable metallic case or pipe, provided with a key, or plug, actuated from the outside, and capable of being made to act upon the india-rubber tube so as to press it together, and thus close the cock or tap.

The joints of the pipes and cocks, or valve-boxes, are as follows:—Round the short conical spigot, or projection, formed on the end of the pipe or joint-piece, is placed a ring of india-rubber, and the spigot, or projection, is then inserted into the short conical depression, or socket, and the two are tightened and secured together by screw-bolts passing through the lugs on the pipes. When each of the pipe-ends to be joined together is formed with a short conical socket, the joint is made by a tubular connecting-piece, both ends of which form short conical spigots, upon which india-rubber rings are placed, and the connecting-piece is then inserted into both the sockets, and when the two pipes are secured together by screw-bolts, a tight joint is obtained, or the connecting-piece may

be formed with two conical sockets, so as to fit corresponding short conical spigots upon the pipe-ends to be joined together.

Another mode of joining pipes consists in forming round the ends of two pipes one or more grooves or ribs, and placing round the pipe ends one or more rings or bands of india-rubber, lead, paper, or other suitable material, and placing upon these bands or rings a collar, or belt of iron, made in one or two pieces, either plain or with projecting edges, the free ends of which are connected together by bolts and nuts, or by one or more clamps or claws, made to take on to dovetailed lugs, formed on the ends of the collar, or belt, the clamps, or claws, being secured in position, if required, by keys, or wedges, inserted between their inner surface and the lugs. If preferred, an inner collar, or belt, may be placed between the rings, or bands, and the connecting collar, or belt.

Another pipe-joint is made by forming, upon a flange on one pipe-end, a conical annular projection, taking into a corresponding annular groove, formed in a flange on the other pipe-end, the two flanges being connected together by a cap, or box, round one pipe, taking into a projection on the other pipe, by means of a bayonet joint; or a piece of lead, or india-rubber, or other suitable material, may be inserted into an annular conical groove, or depression, formed in the face of each pipe, the pipes being joined together by clamps or claws, on flanges formed on the pipe-ends.

When leaden pipes are used, the joints may be made by inserting a double cone of metal into the two pipe-ends, so that the pipe-ends are extended where they meet. The pipes are then secured together by a screw-box passing over a metal ring on one pipe-end, and screwing on to a second metal ring on the other pipe-end.

Some of these joints are applicable for connecting the covers or other parts of valve-boxes to the body of the same.

For preventing small dribblings of water from passing unregistered through the water-meter, there is a metal case, in which a vessel is mounted on an axis, so as to turn over when full of water, and when empty to return to its place through the action of a weight. The apparatus is connected at its upper end with the water-pipe, and at its lower end to the water-meter. Should any water dribble from the closed water-pipe instead of passing directly into the water-meter, it drips into the vessel, and it is only when the quantity of water is sufficient to act upon the meter, and be registered thereby, that the vessel turns over, and the water it contains passes into the meter.

2000.—SCHUSSLER, C. F., Hamburg, "*Improvements in hydrocarbon gas apparatuses.*" Patent dated June 1, 1875.

This invention relates to hydrocarbon gas apparatuses in which atmospheric air is carburetted and furnished with the illuminating power of common coal gas.

The apparatus consists of a closed reservoir, made of sheet copper or other suitable material, within which a coiled metal tube is placed. This reservoir is partly charged with hydrocarbon liquid, the temperature of which can be regulated and heightened by hot water, which circulates from a basin (heated by a flame or stove) outside a reservoir in a compartment placed at the bottom of the same. On one side of the coiled tube within the reservoir a small scoop-wheel is arranged, which can be turned from outside the apparatus by clockwork or other motive power. When the apparatus is at work this wheel lifts the hydrocarbon liquid within the reservoir from its surface to the top of the reservoir, and discharges it there into a small basin, whence it runs into the top end of the coiled tube, and passing through the latter downwards reaches again the bottom of the reservoir. Thus during the operation a continual current of hydrocarbon passes through the coiled tube from the top to the bottom end, and it is this stream of liquid against which the atmospheric air is pressed, and passing the same in the reversed direction absorbs the vapours of the carburetting liquid. The air so impregnated with hydrocarbon vapour can be led directly to the burners, and be used like common coal gas for illuminating purposes.

The pressure of the atmospheric air is attained by a set of bellows moved by mechanical power, which press the air into a vessel suitably connected with the coiled tube, and which is used as a regulator for a constant and normal pressure.

2030.—DYKES, W., and SCOTT, J., Glasgow, "*Improvements in taps or valves for controlling the flow of liquids or fluids.*" Patent dated June 2, 1875.

This invention consists in adding and fitting to the lower side of the middle division or valve-seat and chamber of screw stop valves or taps, a self-acting valve, which is closed by the pressure of the outflowing fluid, and by a light spring fitted over its lower stem, and has a plug or cap below for inserting and withdrawing the valve, and for guiding its under stem while working. Its upper stem, which is made hollow to cut its own hole through the soft facing of the screw valve, is guided in a hole in the upper screw valve or plug. This upper stem is made of a length to suit its recess in the upper valve, and the opening or flow of water desired. The action and advantage of this valve are, that when the ordinary upper screw spindle and valve are screwed up, the spring tends to gradually close the new lower valve, so that only a mean discharge of liquid can be given, regulated by the distance between the two valve lids and the length of the upper stem, thus preventing waste.

2046.—LAKE, W. R., Southampton Buildings, London, "*An improved method of, and apparatus for, treating foul or noxious gases and vapours, to prevent their contamination of the atmosphere, and to utilize them for various purposes.*" A communication. Patent dated June 3, 1875.

According to this invention the gas or vapour is collected in a receptacle of any suitable kind, and conducted therefrom to a furnace or fire-place, where it is, when practicable, utilized for heating purposes, or it may be collected for use as illuminating gas; but where this utilization is not practicable, it is destroyed, or deprived of its noxious properties by combustion with other materials.

In the application of the invention in works for treating lard or tallow, and the like, the tank is provided with a pipe leading to a condenser of any suitable construction, but preferably with a coil. From this condenser a waste-pipe extends to the drains, the pipe being bent to form a water-seal or trap. The condenser is also provided with a pipe for conveying the gas or vapour to a purifier filled with lime, or other suitable purifying agent. From this purifier a pipe extends to a vessel filled, or partially filled, with gasoline or other hydrocarbon liquid, through which the foul gas or vapour is forced by the pressure in the tank. This hydrocarbon vessel is constructed with division plates or passages, so arranged that the gas must pass in small streams through the hydrocarbon liquid, and will thereby be charged or impregnated with carbon. If this gas is to be used in a steam-boiler or other furnace for heating purposes, it is conducted directly from the last-named vessel to the furnace; but if it is to be used for illuminating purposes, it will be conducted into a gasholder.

APPLICATIONS FOR LETTERS PATENT.

2983.—M'LENNAN, W., Liverpool, "Improvements in lifting and force pumps." July 24, 1876.

2994.—MESSENGER, T. G., Loughborough, Leicester, "Improvements in valves for the circulation of hot water, which improvements are also applicable to the circulation of cold water, gas, or other fluids." July 25, 1876.

3001.—WHITESTONE, J., Upper Thames Street, London, "Improvements applicable to lighting and heating purposes." July 25, 1876.

3010.—SMITH, W., San Francisco, U.S.A., "Improvements in fluid-meters or engines for measuring or obtaining power from water, air, or gas." (Complete specification.) July 26, 1876.

3014.—PARSONS, H., Birmingham, "Improvements in joining or connecting pipes." July 26, 1876.

3055.—CLARK, A. M., Chancery Lane, London, "Improvements in apparatus for producing heat by the combustion of gases or vapours, applicable for surgical and other purposes." A communication. July 29, 1876.

3073.—MAGNIAT, H. L., Paris, "An universal new metallic joint for steam, gas, and water engines, preventing all accidents." Aug. 1, 1876.

3092.—MACARTNEY, G., Renfrew, N.B., "Improvements in couplings for fire hose or other pipes or tubes." Aug. 2, 1876.

3095.—SLATER, J. W., Tamworth Terrace, London, "Improvements in deodorizing and purifying sewage." Aug. 2, 1876.

3124.—ROBERTSON, G., Fenchurch Street, London, "Improvements in apparatus for exhausting gas, and applicable for inducing currents of various fluid or pulverized or granular matters." Aug. 5, 1876.

3138.—FOX, ST. G. L., Onslow Gardens, London, "Improvements in the means or apparatus for lighting and extinguishing gas-lamps by electricity." Aug. 8, 1876.

3145.—CATHELS, E. S., Montreal, Canada, "Improvements in apparatus used in the purification of gas." (Complete specification.) Aug. 9, 1876.

3161.—THOMAS, J. J, Philadelphia, U.S.A., "Improvements in apparatus for separating liquids." Aug. 9, 1876.

3164.—BROTHERHOOD, P., Notting Hill, London, "Improvements in apparatus for compressing air or other elastic fluid." Aug. 10, 1876.

3170.—MILLAR, J., Sherburn, York, "Improvements in the mode of treating and clarifying sewage or other impure waters." Aug. 10, 1876.

3173.—YOUNG, W., Clippens, Renfrew, "Improvements in carburetting air and gases, and in the mechanism or apparatus employed therefor." Aug. 11, 1876.

3176.—HADDAN, H. J., Strand, London, "Improvements in valves and gearing for same." A communication. Aug. 11, 1876.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

401.—DUBOIS, J. L., Clapham, London, "Improvements in cocks or taps." Feb. 1, 1876.

683.—NIEBUHR, J. F. W., Duke Street, London, "Improvements in the manufacture of gas for lighting purposes, and in the means therefor." April 27, 1876.

712.—INGHAM, W. P., and HILL, A. C., Redcar, York, "Improvements in machinery for making retorts and other similar articles from clay." Feb. 19, 1876.

751.—WARNER, W. J., South Shields, "Improvements in apparatus for indicating and preventing the escape of gas from main-pipes and connexions, parts of which are also applicable to water-pipes." Feb. 23, 1876.

799.—HOWARD, J., Peckham, London, "Improvements in automatic apparatus for regulating the flow of fluids under pressure, and prevention of waste of water." Feb. 26, 1876.

832.—JENKIN, F., Great Stuart Street, Edinburgh, "Improvements in apparatus for regulating the flow of fluids." Feb. 28, 1876.

858.—STRONG, M. H., Brooklyn, New York, "Improvements in the manufacture of gas for illuminating and other purposes." Feb. 29, 1876.

1123.—CLARK, A. M., Chancery Lane, London, "Improvements in screw-wrenches." A communication. March 15, 1876.

1179.—DAVIES, P. J., King's Cross Road, London, "Improvements in closet and other valves and apparatus for cleansing, watering, controlling, regulating, and arresting the flow or discharge of water, and preventing waste thereof." March 18, 1876.

1738.—PEARN, F., and S., Manchester, "Improvements in steam-pumps, and in valves used in connexion therewith." April 25, 1876.

2066.—WHITWELL, T., South Stockton, York, "Improvements in apparatus for heating air and gases." May 16, 1876.

2081.—ABEL, C. D., Southampton Buildings, London, "Improvements in gas motor engines." A communication. May 17, 1876.

2254.—BELDAM, A., Fenchurch Street, London, "An improved packing for the stuffing-boxes of steam-engines and pumps, and for other joints requiring to be made steam, air, or water tight." May 29, 1876.

2354.—BECKETT, F. R., Chelmsford, Essex, "Improvements in the construction of valves for regulating the flow of steam, water, gas, or other fluids." June 6, 1876.

2455.—BRADDOCK, J., sen., and J., jun., Oldham, Lancs, "Improvements in the construction of governors for regulating the flow of gas or air." June 14, 1876.

2558.—TONGUE, J. G., Southampton Buildings, London, "Improvements in apparatus for raising and forcing liquids." A communication. June 21, 1876.

2637.—LAKE, W. R., Southampton Buildings, London, "Improvements in couplings or connexions for pipes, faucets, and the like." A communication. June 26, 1876.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

2453.—SOMERVILLE, J., and ROBINSON, J., "Improvements in apparatus for discharging gas-retorts." July 16, 1873.

2454.—JACOBSEN, F., "The clarification and purification of sewage, and the discharges of polluted waters from paper mills, printing works, dye works, and factories by means of precipitation." July 16, 1873.

2471.—MULLER, J. A., "Improvements in apparatus for measuring and registering the flow of water and other liquids." July 17, 1873.

2482.—KNAB, D. C., "Improvements in the mode of utilizing the products of distillation of combustible vegetable and animal matters in the production of gas." July 19, 1873.

2503.—WHEELER, C. G., "An improved apparatus for distributing water and regulating and controlling the passage of fluids through pipes or tubes." July 21, 1873.

2532.—WHITE, W., "Improvements in the treatment of sewage and cesspool water." July 24, 1873.

2534.—ROBEY, J., "Improvements in treating sewage and other foul liquids for the economical removal and utilization of soluble and suspended impurities contained therein, and in apparatus for the same." July 25, 1873.

2543.—HEDLEY, T. A., "Improvements in the manufacture, combination, and purification of gases for lighting and heating purposes, and in the apparatus employed therein." July 25, 1873.

2544.—MAIN, E. W., "An improved sanitary safety-valve for preventing the admission of foul air and gases into dwelling-houses, and their escape from common street sewers and drains." July 25, 1873.

2603.—SPICE, R. P., and HARTLEY, F. W., "Improvements in carburettors." Aug. 1, 1873.

2604.—CORBETT, T., "Improvements in ball-joints." Aug. 1, 1873.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £100 BEFORE THE EXPIRATION OF THE SEVENTH YEAR.

2240.—JOHNSON, J. H., "Improvements in the joints of pipes and tubes." July 23, 1869.

2269.—JOHNSON, J. H., "Improvements in the treatment of night soil and other waste products, and for the manufacture of manure therefrom." July 26, 1869.

2309.—RAMSAY, T., "Improvements in apparatus for the manufacture of gas." July 31, 1869.

The GRAND MEDAL of MERIT at the VIENNA EXHIBITION has been AWARDED to

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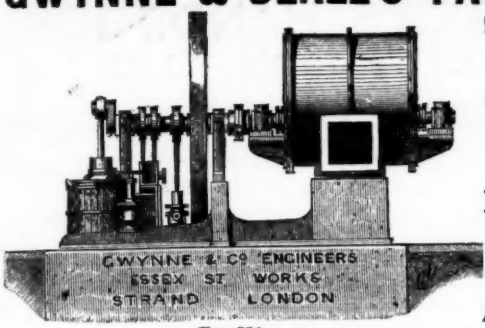

FIG. 224.

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Ever produced, and the most economical in working.

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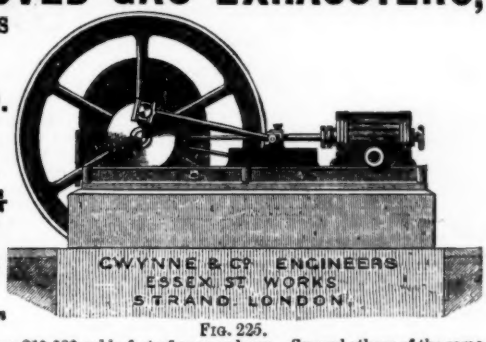


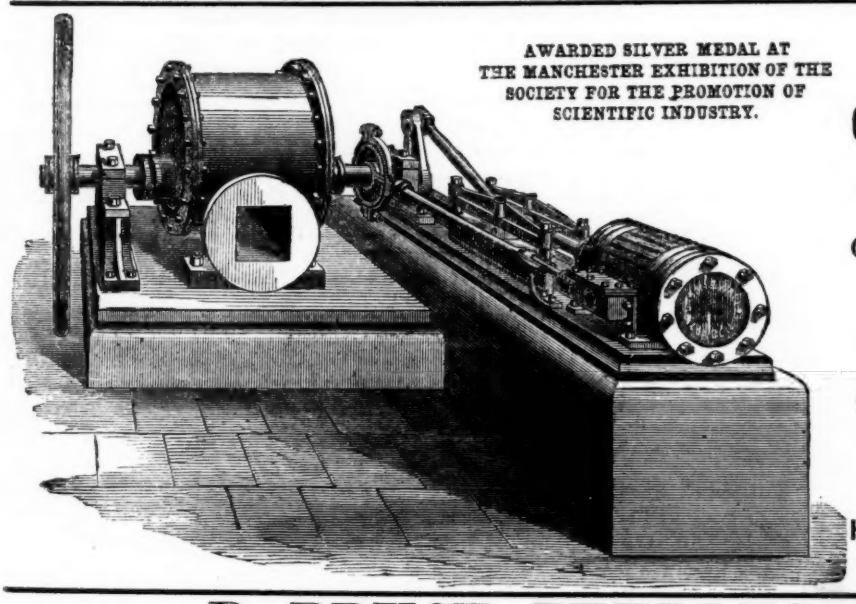
FIG. 225.

Fig. 224 represents one of those erected at the Imperial Gas-Works, Bromley, capable of passing 210,000 cubic feet of gas per hour. Several others of the same size are now on order for the same Company. These Patent Machines combine the highest quality of workmanship and materials, the largest bearings and wearing surfaces, with the **most perfect system of action yet discovered.** Fig. 225 represents one of a series of four at the Nottingham Gas-Works, each passing 52,500 cubic feet per hour. GWYNNE AND CO. *do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, but to produce Machinery of the very highest quality, and the most approved design and arrangement.* Their prices have been estimated with a due regard to the **excellence of the article produced,** and when this is taken into consideration, they have no fear for the result. The orders executed this season for Exhausters and alterations to their patented system amount to over 4,000,000 cubic feet of gas passed per hour, and to over 300 horse power for Engines to drive them. In every instance their work is giving the greatest satisfaction. Numerous testimonials and references can be given.

REGULATORS, BYE-PASSES, STOP-VALVES, GAS-VALVES, & MACHINERY FOR GAS MANUFACTURE, OF ALL SIZES, CAN BE HAD ON APPLICATION TO

GWYNNE & CO., HYDRAULIC & GAS ENGINEERS, ESSEX STREET WORKS, STRAND, LONDON, W.C.

G. & Co. are now manufacturing for a London Gas Company three of their 210,000 cubic feet Patent Gas Exhausters, and many of all sizes.



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TAR, LIQUOR, and other PUMPS,
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ENGINEERS,

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MANUFACTURERS OF WET AND DRY GAS-METERS;

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"These Lamp-Governors are so superior that they are likely to supplant all others."—*Dr. Wm. Wallace, F.R.S.E., F.C.S.*

D. BRUCE PEEBLES AND CO., FOUNTAINBRIDGE WORKS, EDINBURGH.

WANTED, a Station-Meter in good repair, with inlet and outlet connexions, to pass about 2500 cubic feet per hour.

For further particulars, stating price, &c., apply to Mr. J. PICKERING, Ingestre, STAFFORD.

TO GAS COMPANIES.

WANTED, by a practical Man, aged 31, a situation as WORKING MANAGER, who can set clay or iron retorts on the most improved plans for carbonizing. Can do main and service laying, gas-fitting, &c.

Address No. 295, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

METER REPAIRER.

WANTED, at the Reading Gas-Works, a steady and experienced METER-REPAIRER. One accustomed to both wet and dry meters preferred.

Apply, stating wages required, and age, with particulars and references, to Mr. E. BAKER, Engineer.

WANTED, by an experienced practical Man, at home or abroad, EMPLOYMENT at a Water-Works. Understands all kinds of pumping machinery, the construction of reservoirs and filter-beds, laying of mains. Can lay out his own work and use the level, and make the necessary computations required for these works. Present engagement about to terminate.

Apply, by letter, to No. 294, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED immediately, a good Main and SERVICE LAYER.

Address No. 297, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, an engagement as Collector and Manager. Aged 45. Held the office as Collector for small Gas-Works 20 years.

Address No. 296, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Manager, to take charge of several small Gas-Works. He will be required to superintend the whole of the working, and collect the rentals. A thorough knowledge of retort-setting and general fitting necessary. Salary £120 a year.

Apply, stating experience, to MANAGER, care of G. A. Douglas and Co., 1, Lombard Court, LONDON, E.C.

ADVANTAGES OF GAS FOR

COOKING AND HEATING.

HINTS ON GAS BURNERS, &c.

By MAGNUS OHREN, A.I.C.E., F.C.S.

Specimen Copy by post Threepence, direct from MAGNUS OHREN, Gas-Works, Lower Sydenham, London, S.E.

WANTED immediately, two good, steady, respectable, sober Men as leading STOKERS, who thoroughly understand the working of a retort-house and the use of scoop. Wages 37s. per week. None need apply who cannot have good personal characters.

Address No. 292, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a sober, intelligent, middle-aged MAN to take charge of a small Gas-Work. He will be required to make the gas, keep the purifiers and other apparatus in order, and have the general charge and superintendence of the works. To a Man who can be well recommended, and is competent to lay on service-pipes, and to fix and regulate meters, &c., a salary of one guinea per week will be given, with house and garden, fuel and light.

Apply to Mr. G. STEVENSON, Gas Engineer, Wantage, BERKS.

BRITISH ASSOCIATION OF GAS MANAGERS.

VISIT TO BECKTON, JUNE 15, 1876.

PHOTOGRAPHIC GROUPS OF MEMBERS (about 300 in each Picture), taken on the above occasion, can be had at 3s. 6d. each, post free.

Stamps or Post-Office Orders to

F. WELLS, BARKING, ESSEX.

WANTED, in a Provincial Gas-Works, the SERVICES of a Gentleman, from 20 to 25 years of age, who is an experienced Draughtsman and willing to acquire a thorough knowledge of the details of a Gas-Work. His duties will be those of an Assistant Manager.

State age, reference, and salary required, to No. 293, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, an engagement as Assistant ENGINEER by a Gentleman aged 28. Thoroughly understands the manufacture and distribution of gas, the manufacture of sulphate of ammonia, the testing of gas for illuminating power and impurities (quantitively). Is a good draughtman and has had first-class experience in the construction and erecting of Gas-Works on the most approved principles.

Address No. 291, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GASHOLDER MEN WANTED.—Apply to W. C. HOLMES AND CO., Whitestone Iron-Works, HUDDERSFIELD.

TO MANAGERS OF GAS-WORKS.

THE Advertiser, who has just completed a Plan of Mains, including Survey of Roads not in Ordnance maps, for a large Gas Company, wishes for similar employment. Terms moderate. Reference given.

Address A. F., 22, Wood Vale, FOREST HILL, S.E.

THE Gloucester Gas Company require the services of a METER INSPECTOR. None need apply whose character will not bear the strictest investigation as to sobriety and good conduct.

Application, with testimonials and references, to be made at once to R. MORLAND, Manager.

Aug. 14, 1876.

GAS SHARES TO BE SOLD, in a country Gas Company, incorporated by Act of Parliament.

Apply to W. L. RAMSDEN, 11, Fitzwilliam Street, HUDDERSFIELD.

ON SALE—One square Station-Meter, made by West in 1866, to register 8000 feet per hour, with 8-in. valves, bye-pass, &c., now in use and in good condition.

Apply to J. AND J. BRADDOCK, Globe Meter-Works, OLDHAM.

THE Swansea Gaslight Company have for immediate SALE, the following Plant:—

A 6-h.p. Patent Trunk Engine. (Beale.)
Cylindrical Egg-ended Boiler, 20 ft. by 4 ft. 6 in. (Beale.)
Exhauster to pass 15,000 feet per hour. (Beale.)
An 8-h.p. Grasshopper Engine. (Easton and Amos.)
Cylindrical Egg-ended Boiler, 20 ft. by 4 ft. 6 in. (Easton and Amos.)
Exhauster, 20,000 ft. per hour. (Beale.)
Tar, Liquor, and Water Pumps, Eccentrics, Shafting, and Driving Pulleys.
Wrought-iron Condenser, six vertical Legs, 30 ft. high, 24 in. by 6 in., with tar-boxes, dips, and syphons.
Wrought-iron Scrubber, 5 ft. diameter, 20 ft. high.
Cast-iron Scrubber, 3 ft. diameter, 20 ft. high.
A set of four cast-iron Purifiers, 12 ft. square by 5 ft. deep, with galvanized wrought-iron covers, lifting apparatus, four tiers of wooden sieves, 10-in. connexions and valves.

May be seen at the Gas-Works, Swansea. The whole in perfect working order; replaced by plant of larger dimensions.

Further particulars may be obtained on application to Mr. THORNTON ANDREWS, SWANSEA.

THE Directors of the Houghton-le-Spring Gas Company invite TENDERS for the supply and erection, complete, of a Single-Lift GASHOLDER, 72 ft. diameter and 20 ft. deep.

Further particulars may be had on application to the undersigned, at the Gas Office, Newbottle Street, Houghton-le-Spring.

The Directors do not bind themselves to accept the lowest or any tender.

By order,
JAMES MEIKLEJOHN, Engineer and Manager.
Houghton-le-Spring, Aug. 17, 1876.

ROCHDALE CORPORATION.

THE Gas Committee of the Rochdale Corporation invite TENDERS for the supply of Cast-Iron PIPES, delivered at Rochdale Railway Station, as follows, viz.:—

1050 yards 15-inch main.
350 " 3 " "

All to be turned and bored, and coated with Dr. Smith's process.

Particulars as to weights, and any other information required, may be obtained from Mr. Paterson, Gas-Works.

Tenders, endorsed "Gas-Mains," to be sent to me on or before Aug. 29, 1876.

By order,
ZACH. MULLOR, Town-Clerk.
Town-Hall, Rochdale, Aug. 21, 1876.

WIDNES WATER-WORKS.

THE Widnes Local Board invite Tenders for the supply of about 370 tons of 18-in. Cast-Iron WATER-PIPES, lead joints.

Specifications may be obtained at the Engineer's Office, Public Offices, Widnes.

Tenders, endorsed "Pipes," and addressed to the Chairman of the Gas and Water Committee, to be delivered at the above Offices not later than Ten a.m. upon the 4th of September.

The Board do not bind themselves to accept the lowest or any tender.

HENRY ROBERTS.
Public Offices, Widnes, Aug. 8, 1876.

WIDNES GAS-WORKS.

THE Widnes Local Board invite Tenders for the purchase of the GAS TAR and AMMONIACAL LIQUOR produced at their works, for a term of twelve months from the 1st of October next.

Tenders, endorsed "Tar" or "Liquor," as the case may be, and addressed to the Chairman of the Gas and Water Committee, to be delivered at the above works (where conditions of contract may be obtained) not later than 10 a.m. upon the 4th of September.

The Board do not bind themselves to accept the highest or any tender.

HENRY ROBERTS.
Public Offices, Widnes, Aug. 8, 1876.

Now ready, Second Edition, price 7s., by post 7s. 3d.,

THE

GAS MANAGER'S HANDBOOK.

By THOMAS NEWBIGGING, A.I.C.E.

The scope of this work is apparent from its title. The First Edition, published a few years ago, was eagerly sought for, and has been now for some time out of print. The favourable reception accorded to it sufficiently proved that it supplied a generally acknowledged want in the profession. The work has undergone careful revision; much new matter has been added; and the New Edition is published in fcap. 8vo., morocco, gilt.

"This may be fairly described as among the most useful manuals of its class."—*Iron.*

"Gas managers will find it a very useful companion."—*Chemical News.*

"The new edition is published in a small octavo form, which makes it a handy book, either for the pocket or the desk."—JOURNAL OF GAS LIGHTING.

"An excellent little book."—*Mr. R. H. Patterson (late Gas Referee) in the* JOURNAL OF GAS LIGHTING *April* 28, 1874.

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Manufacturers of FIRE-BRICKS, LUMPS, TILES,

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N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

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AND FOR THE
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AND ALL MATERIALS FOR GAS MANUFACTURE AND DISTRIBUTION.

THE THAMES BANK IRON COMPANY,

(Successors to LYNCH WHITE,)

SUPPLY FROM STOCK

CAST-IRON RETORTS, SOCKET-PIPES for GAS or WATER PURPOSES, FLANGE-PIPES for STEAM, RAIN-WATER PIPES and GUTTERS, HOT-WATER PIPES and BOILERS, and all requisite Connexions for same; also LAMP-COLUMNS, LAMPS, WROUGHT FRAMES, WROUGHT-IRON TUBING, &c., &c.

All kinds of Gas-Works Apparatus and General Castings made to Pattern or Drawing.

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And every Description of Gas Apparatus.

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Burs, Lumps, Stays, Shields & other Bricks, & Gas-Retorts.

A LARGE QUANTITY OF RETORTS ALWAYS IN STOCK.

Circular .	14 in.,	15 in.,	16 in.,	18 in.
Ovals . .	17 in. × 14 in.,	17 in. × 15 in.,	20 in. × 15 in.,	21 in. × 15 in., &c.
D's. . .	14 in. × 14 in.,	15 in. × 12 in.,	15 in. × 13 in.,	17 in. × 14 in., 18 in. × 13 in.
	18 in. × 15 in.,	20 in. × 16 in.,	22 in. × 14 in.,	24 in. × 14 in., 24 in. × 15 in., &c.

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Samples, Testimonials, and full Particulars on application.

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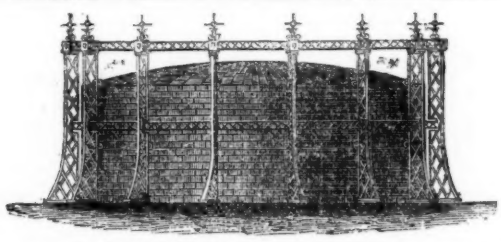
ESTIMATES FOR GAS-WORKS OF ANY SIZE.

REFERENCES TO 500 WORKS ALREADY ERECTED.

N.B.—It is most particularly requested that all Communications be addressed to the FIRM ONLY, as circumstances have arisen which render this necessary.



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LIMITED,

TIPTON, STAFFORDSHIRE.

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GAS ENGINEERS, IRONFOUNDERS, &c.,

MANUFACTURERS OF

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AND ALL REQUISITES FOR EITHER

GAS OR WATER WORKS;

ALSO

MAKERS OF ROOFS, BRIDGES, &c.

MANAGER AND ACCOUNTANT.

THE Peterborough Gas Company require a MANAGER of their works, who must be thoroughly able to take charge of them and to keep the accounts, and balance the same half yearly. He must devote his entire time to his engagement. A clerk and collector are kept. The present annual make of gas is 44 million cubic feet, and the population of the borough about 20,000. The works have recently been almost entirely renewed, and are in an excellent state, being supplied with the most modern and improved machinery.

The Manager will be required to find his own house, but the free use of gas will be allowed.

Applications, endorsed "Application for Office of Manager and Accountant," stating salary required, accompanied by recent testimonials, and stating the time when duty could be commenced, to be sent in to the undersigned on or before Saturday, the 2nd day of September, 1876.

By order of the Board of Directors,
JNO. GRAVES, Secretary.

Dated this 19th day of August, 1876.

THE Directors of the Sheffield United Gaslight Company require the services of an intelligent and energetic MAN to assist the Manager in the commercial department of the Company. Age from 30 to 40. One with experience in the working of Gas Companies would be preferred.

Applications, stating age, salary required, and references, must be addressed to the Chairman of the Company not later than the 27th inst.

THOS. ROBERTS, Manager.

Gaslight Offices, Sheffield, Aug. 12, 1876.

TO TAR DISTILLERS, &c.

THE Directors of the Kingston-upon- Thames Gas Company are prepared to receive TENDERS for the surplus TAR produced at their works at Kingston, from the date hereof to June 30, 1877. Quantity about 80,000, more or less. Tenders to be at per gallon, f.o.b. the Contractor's barge at Kingston.

Further particulars may be obtained from Mr. Packham, Manager at the works, where a copy of contract may be seen.

Tenders to be sent to Mr. W. A. Fricker, Secretary, Gas Offices, Church Street, Kingston, on or before the 28th of August inst., endorsed "Tender for Tar."

The Company do not pledge themselves to accept the highest or any tender.

By order,
W. A. FRICKER, Secretary.

Gas Offices, Kingston, Aug. 15, 1876.

TENDERS FOR GAS COAL.

THE Directors of the Holyhead Gas Company are prepared to receive TENDERS for the supply of the best GAS COAL, in such quantities as may be required up to June 30, 1877, and June 30, 1878, respectively. The probable quantity being about 1200 tons per year.

The Coal may be tendered for screened or unscreened, to be fresh, and properly free from stones, pyrites, and all impurities.

Tenders (with analysis) stating the particular name of the seam, and locality from which the Coals are offered to be supplied, price f.o.b. at Garston Docks, or delivered per railway at Holyhead, must be delivered on or before Aug. 26, 1876.

The Directors do not bind themselves to accept the lowest or any other tender.

JOHN HUGHES.

Castle House, Holyhead.

T. NEWBIGGING,

CONSULTING GAS ENGINEER,

5, NORFOLK STREET, MANCHESTER.

HENRY LYON,

ENGINEER,

BROOKLYN, CHEETHAM HILL ROAD,

MANCHESTER.

Mr. ALFRED LASS,

60, CORNHILL, LONDON, E.C.,

Is prepared to open the Books, and, if necessary, keep the Accounts of Gas and Water Companies.

To examine the Books and Accounts, and prepare Balance-Sheets for the information of Directors.

To assist Secretaries in preparing Balance-Sheets, according to the "Gas-Works Clauses Act, 1871;" or may be consulted with respect to Accounts generally.

SCOTTISH CANNEL COAL SUPPLY AND GAS ENGINEERING ESTABLISHMENT.

Mr. WM. ROMANS

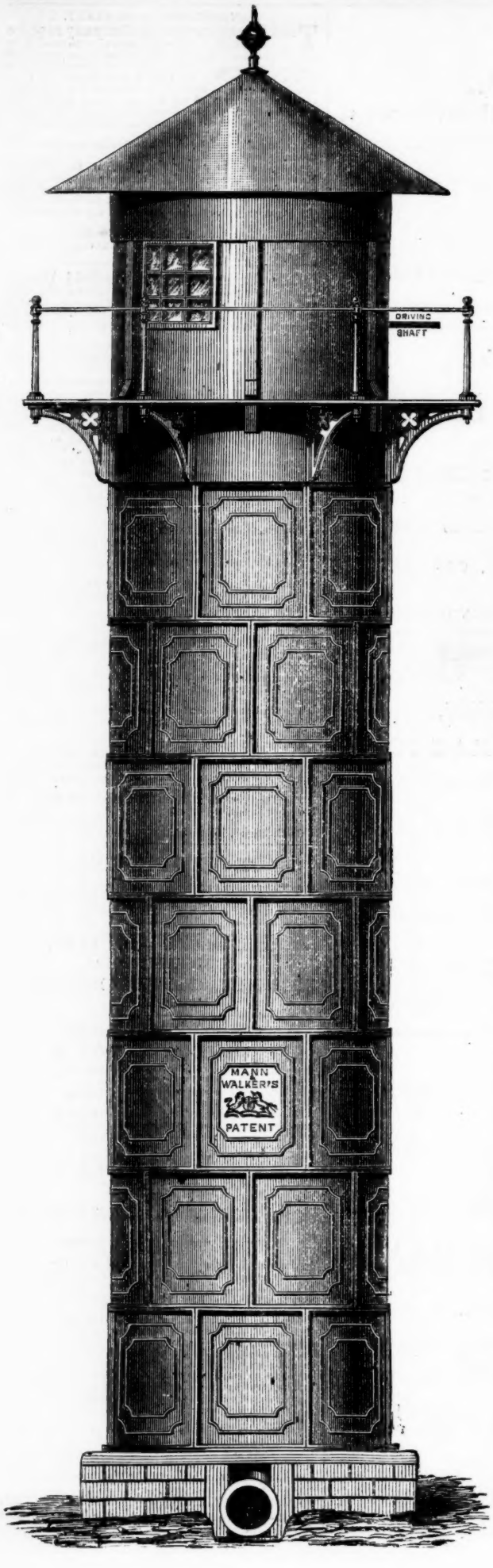
having accepted the Chief Engineership of the Sheffield Gas Company, the firm of J. and W. Romans, Gas Engineers and Coal Factors, is dissolved, and Mr. John Romans, C.E., F.G.S.E., is again Sole Proprietor.

Mr. Romans, in resuming the control of this old established business, embraces the opportunity to invite the special attention of Gas Companies to the great importance of a judicious selection of their Cannel. It is a fact known to those who have carefully manipulated the distillation of gas from Cannel and other Coal, with a view to economic results, that by an intermixture of the lighter with the heavier gases, much of the rich hydrocarbons are saved, which otherwise would be lost in the process of manufacture.

Mr. Romans places at the disposal of his patrons the practical knowledge acquired during 30 years continuous manufacture and sale of gas and its residuary products. Also in all matters appertaining to Gas-Works he is prepared to advise, or contract for the supply or repair of the apparatus.

OFFICES, 30, ST. ANDREW SQUARE, EDINBURGH.

N.B.—Mr. Romans has no *Interest* in, nor is he *Agent* for, any colliery.



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LONDON, E.C.

MANN & WALKERS' PATENT SCRUBBER.

By Letters Patent in Great Britain, Europe, and the United States of America.

By some important improvements recently patented, the purifying power of these Scrubbers has been much increased, and a stronger ammoniacal solution obtained, which is found to absorb a large portion of the carbonic acid contained in gas, effecting an important saving in money and labour in the lime purifiers, and where oxide only is used, the increase in the illuminating power of the gas obtained by these Scrubbers is shown in a remarkable degree, in consequence of the large quantity of carbonic acid removed from the gas.

It is to be particularly noted that the im-portant results of these Scrubbers do not depend upon the machinery alone. The entire internal construction of the Scrubber bears an almost equally important part. For this reason, where it is desirable to convert existing Scrubbers, whose dimensions happen to be suitable, the work commences by ripping out the whole of the interior of the shell, and beginning the internal construction *de novo* from bottom to top.

They are, in all cases, constructed under guarantees to perfectly perform their work. They are now extensively used in the largest gas-works of London and the chief cities of Europe, the number in use exceeds **one hundred,** and their perfect efficiency and profit to a gas company have been fully established with every variety of coal used in Europe. References can be given to the largest gas-works in Europe.

By their use the department of purification from ammonia upon a gas-works is made complete, without the aid of prepared oxide of iron, chemicals in purifiers, or any other supplementary process, and the whole ammoniacal residual product contained in the coal is absorbed and obtained in the form most profitable to a gas company, while the requirements of all Acts of Parliament and of the Board of Trade, relating to incorporate gas companies, are satisfied.

Foul Gas, properly condensed, entering the inlet is, by once only passing through the Scrubber, completely purified from ammonia with regular certainty day by day, without any further trouble, or any other process, effected by a very small quantity of clear water let into the machinery room at the top of the Scrubber, which is discharged at the liquor outlet at the bottom, from Newcastle coal at about 18 to 20 ounces strength, from Yorkshire and other coals, generally from 25 to 30 ounces strength; while acidulated litmus or turmeric exposed at the Scrubber outlet will not show the slightest discoloration, and there is not a quarter of a grain of ammonia per 100 feet left unabsorbed.

They contain their own engine power, re-quiring only a small inappreciable quantity of steam from the gas-works boiler, and are then complete in themselves, ready for service.

Applications relating to dimensions and prices should be addressed to us, C. AND W. WALKER, 8, FINSBURY CIRCUS, LONDON, E.C., or to Mr. WILLIAM MANN, late Superintendent of the Chartered Gas-Works, BLACKFRIARS, LONDON; they should state approximately the largest make of gas in 24 hours on a winter's day, and the smallest make on a summer's day, to be purified.

J. & J. BRADDOCK,

GAS ENGINEERS,

GLOBE METER-WORKS, OLDHAM,

MANUFACTURERS OF

WET & DRY CONSUMERS GAS-METERS,

OF THE HIGHEST EXCELLENCE ONLY;

ALSO LICENSEES AND MANUFACTURERS OF

WARNER & COWAN'S PATENT SELF-REGULATING GAS-METERS;

ROUND STATION-METERS,

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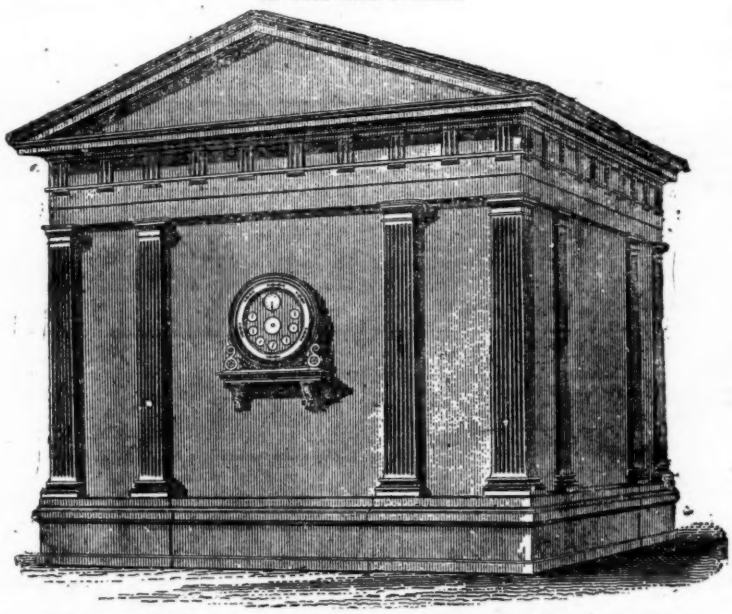

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GAS COOKING APPARATUS.

Home and Foreign Orders promptly attended to.

All Sizes of CONSUMERS METERS, STATION-METERS, and GOVERNORS generally in Stock.

Orders almost invariably despatched on the day of receipt.

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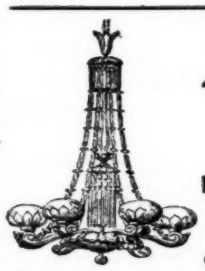

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WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.

TABLE GLASS OF ALL KINDS.

CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.

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GAS AND CONSULTING ENGINEER,

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PATENTEE and MANUFACTURER of the following Inventions:—

RETORT SETTINGS—giving great Economy of Fuel.

STEAM-ENGINES and EXHAUSTERS, FOUR-WAY VALVES.

FUEL-MACHINE, for Compressing breeze and Tar.

WASHERS, SCRUBBERS, and PURIFIERS, that Economize Space and Cost.

N.B.—Pamphlet, with Eighteen Illustrations of the foregoing, with letterpress on the construction of Gas-Works, post free, 2s. 6d.

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FIRE CLAY & BRICK WORKS,

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Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS LUMPS, TILES, and every description of FIRE-BRICK.

Proprietors of

BEST GLASS-HOUSE POT and CRUCIBLE CLAYS.

Successors to

E. BAKER AND CO., LATE BRIERLEY HILL, STAFFORDSHIRE.

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GAS-RETORTS, GLASS-HOUSE FURNACE,

BLAST-FURNACE, TANK BRICKS, LUMPS, TILES,

And Every Description of Best Fire-Bricks.

"SELLARS' CEMENT"

PREVENTS WASTE OF GAS FROM RETORTS;

SAVES CLAY RETORTS FROM DESTRUCTION BY FIRE;

GREATLY ECONOMIZES THE USE OF FIRE-BRICKS;

And PREVENTS ALL POSSIBLE LOSS of GAS FROM LEAKAGE.

J. C. SELLARS,

THE GAS CEMENT WORKS,

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(ESTABLISHED MORE THAN 15 YEARS,)

THE ORIGINAL MANUFACTURER OF

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WOOD SIEVES,

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MADE BY MACHINERY

CAPABLE OF MAKING 10,000 FEET WEEKLY.

References to Hundreds of First-Class Engineers.

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GAS AND WATER PIPES.

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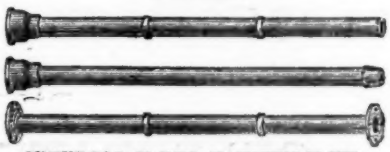
CAST-IRON GAS AND WATER PIPES.



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The NEW PATTERN

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LOTHIAN'S CANNEL
Yields 12,500 cubic feet of 34-candle gas per ton, and 9 cwts. of excellent coke, containing only 4 per cent. of ash.

MUIRKIRK, No. 1, CANNEL
Yields 12,160 cubic feet of 32·5-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash.

OLD WEMYSS CANNEL
Yields 13,320 cubic feet of 32·5-candle gas per ton.
Prices and full Analyses on application.

CANNEL COAL.
COPPA COLLIERY, MOLD,
Beg leave to call the attention of Gas Companies to the superior quality of their
CANNEL FOR GAS-MAKING PURPOSES.

This Cannel produces in actual working, in iron retorts, 9200 cubic feet of 32-candle gas, and upwards of 11 cwt. of coke, and in clay retorts will produce 11,500 cubic feet of 25·9-candle gas.
Ports of shipment—Birkenhead or Connah's Quay.
Waggons supplied for delivery by railway to any part of England or Wales.
For particulars, prices, and rates of freight, apply to The Coppa Colliery, Mold, FLINTSHIRE.

JAMES OAKES & CO.,
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WENLOCK IRON WHARF, 21 & 22, WHARF ROAD, CITY ROAD, LONDON, N.,
Keep in London and at their works large stocks of PIPES and CONNEXIONS (1½ to 36 inches in diameter); also make and supply Retorts, Tanks, Columns, Girders, Special Castings required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.
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NEAR NEWCASTLE-UPON-TYNE,
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MANUFACTURERS OF
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SCOTSWOOD FIRE-BRICK WORKS,
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GAS COAL.
POPE & PEARSON, LIMITED, have
now the authority of several of the most eminent Gas Engineers of London in stating that their Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.
One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.
For further particulars, apply to POPE AND PEARSON, LIMITED, West Riding and Silkstone Collieries, near LEEDS.

HEBBURN MAIN GAS COALS.

Cubic feet of Gas yielded per ton . . .	10,050
Illuminating power in sperm candles . .	15·4
Yield of coke per ton of good quality . .	13¾ cwts.

THE TYNE COAL COMPANY, LIMITED, OWNERS.
W. RICHARDSON, Fitter,
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PATRONIZED BY THE ROYAL ARSENAL, WOOLWICH.
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Kite method of Repairing Church Spires and High Chimneys. Chimneys straightened, pointed, and hooped. Old Chimneys pulled down by a process requiring no scaffolding or stoppage of work, by competent workmen, under personal supervision. For Lightning Conductors—cheapness and method of fixing—apply to C. R. FERGUSON, 12, Canal Road, MILE END.

BIRTLEY IRON WORKS,
CHESTER-LE-STREET,
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Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.
Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.
Agent in London, Mr. J. MANWARING, 101 Cannon Street, E.C.

JOHN DEPLEDGE,
Inventor of the
DRY-FACED CENTRE-VALVE FOR PURIFIERS,
GAS AND HOT WATER ENGINEER,
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SCOTCH CANNEL COALS.

The Subscriber is prepared to contract for the supply of all the principal SCOTCH CANNEL COALS. Prices and Analyses of the various Coals will be forwarded on application.

JAMES M'KELVIE,
CANNEL COAL MERCHANT,
HAYMARKET, EDINBURGH.
Established 1840.

THE
FRAMWELLGATE COAL COMPANY,
DURHAM,
Are prepared to supply their
SCREENED AND NUT GAS COALS.
This Coal yields 11,000 cubic feet of gas and 13½ cwts. of coke per ton.
OFFICES: ROYAL EXCHANGE, MIDDLESBROUGH.

W. GARDNER AND CO.,
STEAM SAW MILLS,
13 WHARF, MACCLESFIELD STREET NORTH, CITY ROAD,
Makers of
WOOD SIEVES FOR GAS PURIFIERS,
ROUND OR SQUARE, PARALLEL OR BEVELLED.
CHEAPEST IN LONDON.

C. & W. WALKER'S
WOOD PURIFIER SIEVES,
Which have now been used for fifteen years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.

MIDLAND IRON-WORKS,
DONNINGTON, NEAR NEWPORT, SHROPSHIRE.
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G. J. EVESON,
GAS COAL MERCHANT,
STOURBRIDGE.
Delivery per Rail to any Part.

THE WIGAN COAL & IRON COMPANY,
LIMITED,
DISTRICT OFFICE: 18, BENNETT'S HILL, NEW STREET, BIRMINGHAM; AGENT: W. M'GOWAN;
Supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, &c.
N.B.—The Wigan Coal and Iron Company, Limited, are exclusive owners of the well-known HAIGH HALL AND KIRKLESS HALL GAS COAL COLLIERIES.

MESSRS. NEWTON, CHAMBERS, & CO.,
THORNCLIFFE IRON-WORKS AND COLLIERIES,
NEAR SHEFFIELD,
STRONGLY RECOMMEND A TRIAL OF THEIR
CELEBRATED SILKSTONE GAS NUTS.

Analysis by F. J. EVANS, Esq., Chartered Gas Company, Horseferry Road, Westminster:—

(COPY.)

	Cubic Feet of Gas per Ton of Coal.	Illuminating Power in Candles.	Coke per Ton of Coal used.	Ash in Coke, per Cent.	Sulphur in Coal, per Cent.
Silkstone Nuts . . .	10·800	15·85	12·66 cwt.....	6·0	0·69

NOTE.—The illuminating power of the gas was tested by the standard burner now used in London by the Gas Referees, under the City of London Gas Act, 1868.

Horseferry Road, Westminster, March, 1870. (Signed) F. J. EVANS.

These Nuts are extensively used by various Gas Companies throughout the Kingdom, who bear strong testimony to their value.

APPLICATIONS FOR PRICES, &c., TO BE SENT DIRECT TO THE COLLIERY, AS ABOVE.

THE SILKSTONE & DODWORTH COAL & IRON COMPANY, LIMITED,

DODWORTH, BARNSLEY.

BENJAMIN WHITWORTH, Esq., M.P. . . . . Chairman.
Mr. RICHARD HARTLEY . . . . . Managing Director.

REAL OLD SILKSTONE GAS COAL.

JAMES PATERSON, Esq., Gas Engineer, of the Warrington Gas Company, reported, Aug. 10, 1875:—

"This Coal possesses remarkable qualities as a gas and coking coal, and appears SECOND TO NONE IN THE KINGDOM. It contains the large quantity of 699 lbs. of illuminating matter, and 1498 lbs. of coke to the ton, and produces **12,240** cubic feet of 16·66 candle gas."

The above Company are raising nearly a thousand tons of the Real Old Silkstone Gas Coal per working day.

PRICES QUOTED TO ANY RAILWAY STATION, OR F.O.B. HULL, GRIMSBY, GOOLE, KEADBY, LIVERPOOL, AND FLEETWOOD.

ALBERT GAS COAL.

THE DERBYSHIRE

SILKSTONE COAL COMPANY,

LIMITED,

CAN OFFER A

GAS COAL

Of superior quality, delivered at any station in England and Wales.

Purified gas per ton of coal in cubic feet (average)	10,775
Weight of coke in lbs. per ton of coal	1,465

ANALYSIS AND PRICES ON APPLICATION TO

Mr. EDMUND TAYLOR, Secretary,

ALBERT COLLIERY, NEWBOLD, NEAR CHESTERFIELD.

1862.

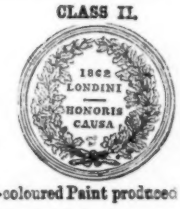
PATENT ANTIMONY PAINT.

MADE ONLY BY

GEORGE HALLETT & CO.,

296, ROTHERHITHE, LONDON, S.E.

CLASS II.



This Paint having been in general use over fourteen years (especially in some of the principal Gas-Works), and proved itself the best light-coloured Paint produced for resisting the influence of vitiated atmospheres, it is important that its qualities should be more widely known.

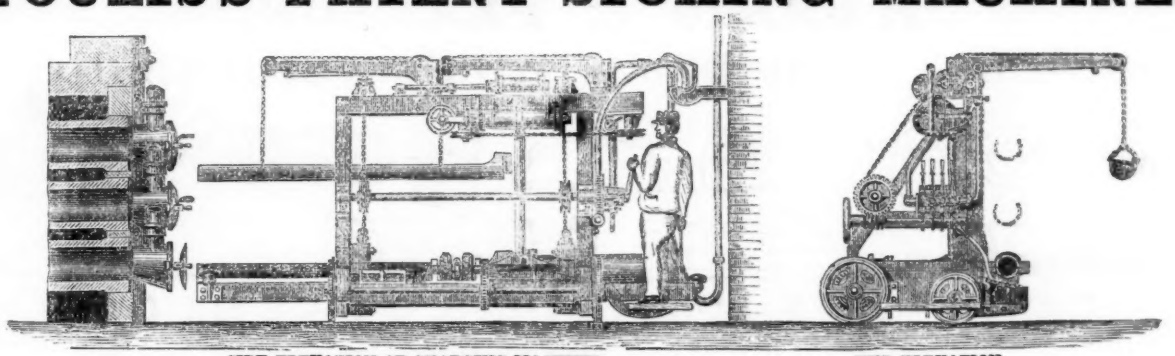
It is not discoloured like white lead in a sulphuretted atmosphere, nor washed off like white zinc; and its light colour reflecting heat, produces much less expansion of gas in holders painted with it than with dark colours, besides rendering them much more sightly. Its specific gravity is so much below white lead that the same weight will cover one-third more surface, while it is equal in body; and its price being about the same (30s. per cwt.), it is actually one-third cheaper. From experience, its manufacture is greatly improved, and it is quite suitable for all purposes in which white lead is employed.

The following Gas Companies in London have used the Paint for years—viz., The Gaslight and Coke, Imperial, Independent, City of London, Commercial, London, and Surrey Consumers.

N.B.—Antimony Paint, COVERING SO MUCH MORE WORK, costs about 20s. per cwt., as compared with White Lead at 30s. per cwt.; a similar economy arises from its use in Steam and Gas Joints, for which purpose it is superior to White Lead.

SPECIAL DRIERS FOR ANTIMONY PAINT SUPPLIED.

FOULIS'S PATENT STOKING MACHINE.



SIDE ELEVATION OF CHARGING MACHINE. END ELEVATION

(*The Drawing Machine will be Illustrated in next week's Advertisement.*)

Makers: TANGYE BROTHERS and HOLMAN, London and Birmingham; ADAM WOODWARD and SON, Manchester; ROBERT LAIDLAW and SON, Glasgow; MASCHINENBAU-ACTIEN-GESELLSCHAFT HUMBOLDT, Kalk bei Deutz; Or all particulars may be had from JAMES WOTHERSPOON, 31, St. Vincent Place, Glasgow.

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MANUFACTURED BY THE

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The object attained by this invention is the *correct measurement of Gas under every fluctuation of the pressure.*

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The "RELIANCE" METER has been tested by several of the most experienced official meter inspectors. Copies of their reports may be obtained on application to the

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Of the most perfect description for all purposes relating to Gas.

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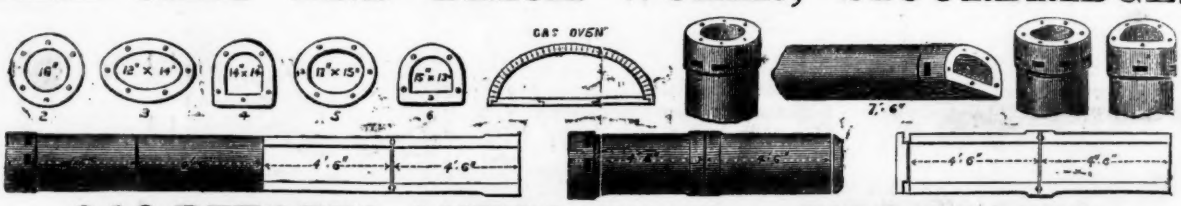

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